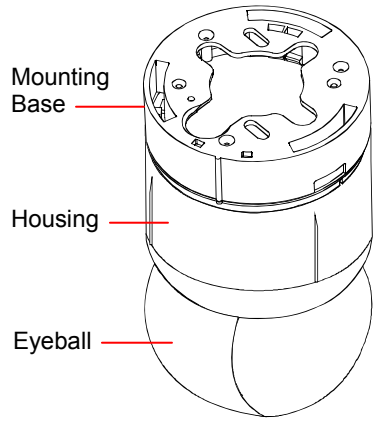
SpeedDome® Ultra VII and Ultra VIIE Camera Dome

Installation and Service Guide

Figure 1. SpeedDome Ultra VII/VIIE dome



Camera Dome Product Codes

Product	Description
RAS915LS	BW, 60HZ, 22X, NO BASE, BLACK
RAS915LSI	BW, 60HZ, 22X, I/O BASE, BLACK
RAS915LSP	BW, 60HZ, 22X, STD BASE, BLACK
RAS915LS-1	BW, 50HZ, 22X, NO BASE, BLACK
RAS915LSI-1	BW, 50HZ, 22X, I/O BASE, BLACK
RAS915LSP-1	BW, 50HZ, 22X, STD BASE, BLACK
RAS916LS	COLOR, 60HZ, 22X, NO BASE, BLACK
RAS916LSI	COLOR, 60HZ, 22X, I/O BASE, BLACK
RAS916LSP	COLOR, 60HZ, 22X, STD BASE, BLACK
RAS916WLS	COLOR, 60HZ, 22X, NO BASE, WHITE
RAS916WLSI	COLOR, 60HZ, 22X, I/O BASE, WHITE
RAS916WLSP	COLOR, 60HZ, 22X, STD BASE, WHITE
RAS916LS-1	COLOR, 50HZ, 22X, NO BASE, BLACK
RAS916LSI-1	COLOR, 50HZ, 22X, I/O BASE, BLACK
RAS916LSP-1	COLOR, 50HZ, 22X, STD BASE, BLACK
RAS917LSE	DAY/NIGHT, 60HZ, 23X, NO BASE, BLACK
RAS917LSI	DAY/NIGHT, 60HZ, 23X, I/O BASE, BLACK
RAS917LSP	DAY/NIGHT, 60HZ, 23X, STD BASE, BLACK
RAS917WLSE	DAY/NIGHT, 60HZ, 23X, NO BASE, WHITE
RAS917WLSI	DAY/NIGHT, 60HZ, 23X, I/O BASE, WHITE
RAS917WLSP	DAY/NIGHT, 60HZ, 23X, STD BASE, WHITE
RAS917LSE-1	DAY/NIGHT, 50HZ, 23X, NO BASE, BLACK
RAS917LSI-1	DAY/NIGHT, 50HZ, 23X, I/O BASE, BLACK
RAS917LSP-1	DAY/NIGHT, 50HZ, 23X, STD BASE, BLACK

Contents

About this Guide 1
About the Camera Dome 2
Cable Requirements 7
Install/Removal Tool for Base with I/O Board 8
Power-Up Routine 9
Synchronizing Domes 9
Diagnostic LEDs 9
Warnings and Cautions 9
Indoor Installation 11
Using the Install/Removal Tool 18
Troubleshooting Indoor Domes 20
Illustrated Parts List 30
Specifications-Indoor Dome 32
Specifications-22X Camera 33
Specifications-23X Camera 34
Declarations 35
Appendix A: Checking Power and Data for Domes Using the Base without I/O Board 36
Appendix B: Vicon Wiring Configurations 38

About this Guide

This guide explains how to connect the camera dome to a mounting base and how to service it.

It does not explain how to:

- Determine a mounting location for the camera dome. The mounting location is determined by customer requirements; therefore, this information is provided separately.
- Attach the mounting base. There are two types of mounting bases. See information shipped with the base.
- Assemble housings and structures used with this camera dome. See information shipped with the housing and structure.
- Program the camera dome. See operator's guide shipped with the dome.

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About the Camera Dome

The SpeedDome Ultra VII/VIIE camera dome (Figure 1) comes in black or white finish (to blend into surrounding areas), mounts indoors or outdoors (with accessory outdoor enclosure), and can communicate with the video controller over a SensorNet 485, RS-422, Manchester, or UTC (up-the-coax) network. The dome consists of a mounting base, housing, and rotating eyeball assembly.

Mounting Base

The housing and eyeball assembly connects to the base using a twist and lock action, enabling it to be moved easily from one location to another. The base attaches directly to a hard or tile ceiling, or indirectly to walls or ceilings using one of many optional housings and mounting structures. As shown in Figure 2, two base types are offered: a standard base (without I/O board) and a base with I/O board.

- **Base without I/O board.** With this base, video, data, and power cables are inserted through the base and attached to the top of the housing and eyeball assembly, which is then connected to the base. A lanyard connects between the base and the housing and eyeball assembly to prevent cables from being pulled during disassembly.
- **Base with I/O Board.** With this base, video, data, and power cables are pre-connected to an I/O PC board. A spring-finger connector on the board makes electrical contact with the housing and eyeball assembly as it connects to the base.

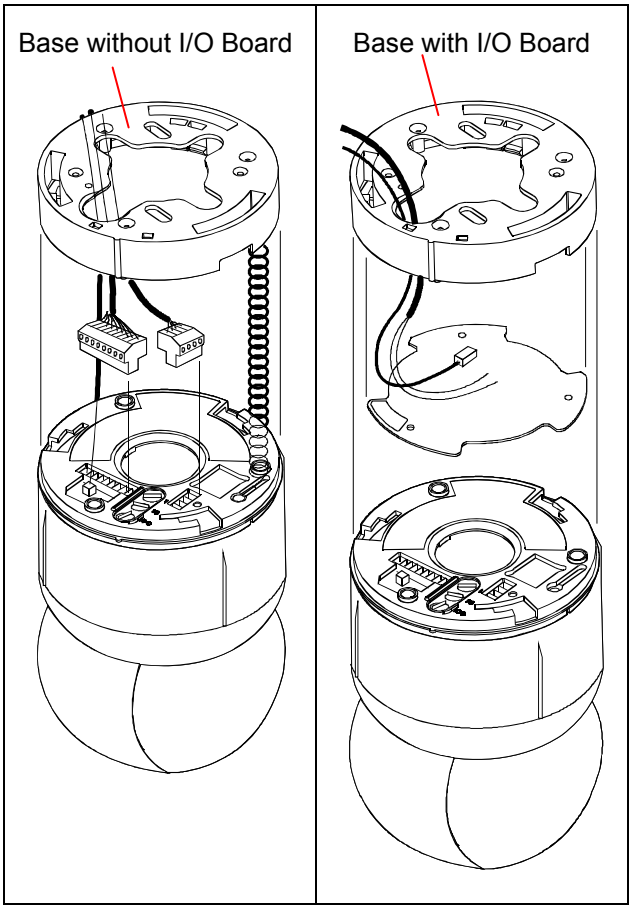
Housing and Eyeball Assembly

The housing and eyeball assembly consists of the following:

- **Housing.** The housing contains the dome's power supply, pan motor, and electronics used to operate the eyeball. The housing provides one alarm input and one alarm output using the base without I/O board, or four alarm inputs and four alarm outputs using the base with I/O board.
- **Eyeball.** With a diameter of 120mm (4.75in), the eyeball contains a camera, tilt motor, and associated electronics. The eyeball enables the camera to pan and tilt to track a target moving in any direction even as it moves under the dome.

  Two slot covers in the eyeball facilitate access to the camera, one of which incorporates an opening for the camera lens. Remove both covers to improve ventilation when the dome is to be used outdoors.

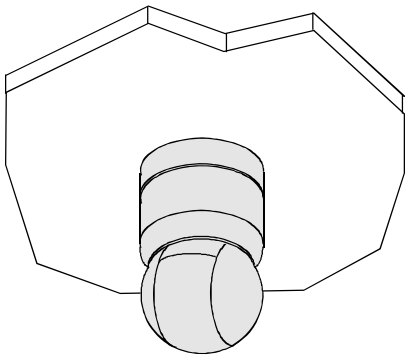
Figure 2. Mounting base and housing and eyeball assembly



Indoor Ceiling Mounting

Using hardware shipped with the base, the dome attaches directly to indoor ceilings made of sheet rock, wood, metal, or concrete (Figure 3).

Figure 3. Surface mounting to hard ceilings



Indoor Ceiling/Wall Mounting (Optional)

The camera dome attaches to one of the following optional indoor mounting structures (Figure 4).

Sheet Rock, Plaster or Wood Ceilings

RHIUTH	Top hat housing with trim ring This housing attaches to a ceiling or to most indoor mounting structures. A bubble and trim ring provide concealment. Optional bubbles: RUCLR (clear), RUSLV (silver), RUSMK (smoked), or RUGLD (gold). Plenum adapter RHPLA may be required to meet local fire codes.
RHIUHC	Hard ceiling bracket Enables top hat housing to be recessed in ceiling (requires top hat RHIUTH).
RHIUFB*	Fixed bracket Enables top hat housing to be recessed in ceiling (requires top hat RHIUTH).
RHIUPNDT†	Pendant mount Suspends dome from a hard ceiling.

Structural I-Beams

RHIUIB / RHIUIBM†	I-beam mount Enables dome t suspend from an I-beam. RHIUIBM version adds pipe tee and related accessories.

Electrical Box in Ceiling

RHIU3X3†	3 X 3 mounting plate Attaches dome to a standard 3.5 x 3.5 duplex electrical box. **CAUTION:** Do not use the same electrical box used for line voltage mains.
RHIU4X4†	4 X 4 mounting plate Attaches dome to a standard 4 x 4 duplex electrical box. **CAUTION:** Do not use the same electrical box used for line voltage mains.

* Option in white, but can be painted to match decor.
† Top hat housing/dome assembly also mounts to structure.

Tile Ceilings

RHIUFB	Fixed bracket Enables top hat housing to be recessed in a 2x2 tile (requires top hat RHIUTH).
RHIUAB	Adjustable bracket Enables top hat housing to be recessed in a 2x4 tile (requires top hat RHIUTH).
RHIU2X2M*	2 X 2 tile mount Enables top hat housing to be recessed in 2x2 openings (incorporates top hat housing).
RHIU2X2P*	2 X 2 tile pendant mount Enables dome to be suspended from 2x2 openings.

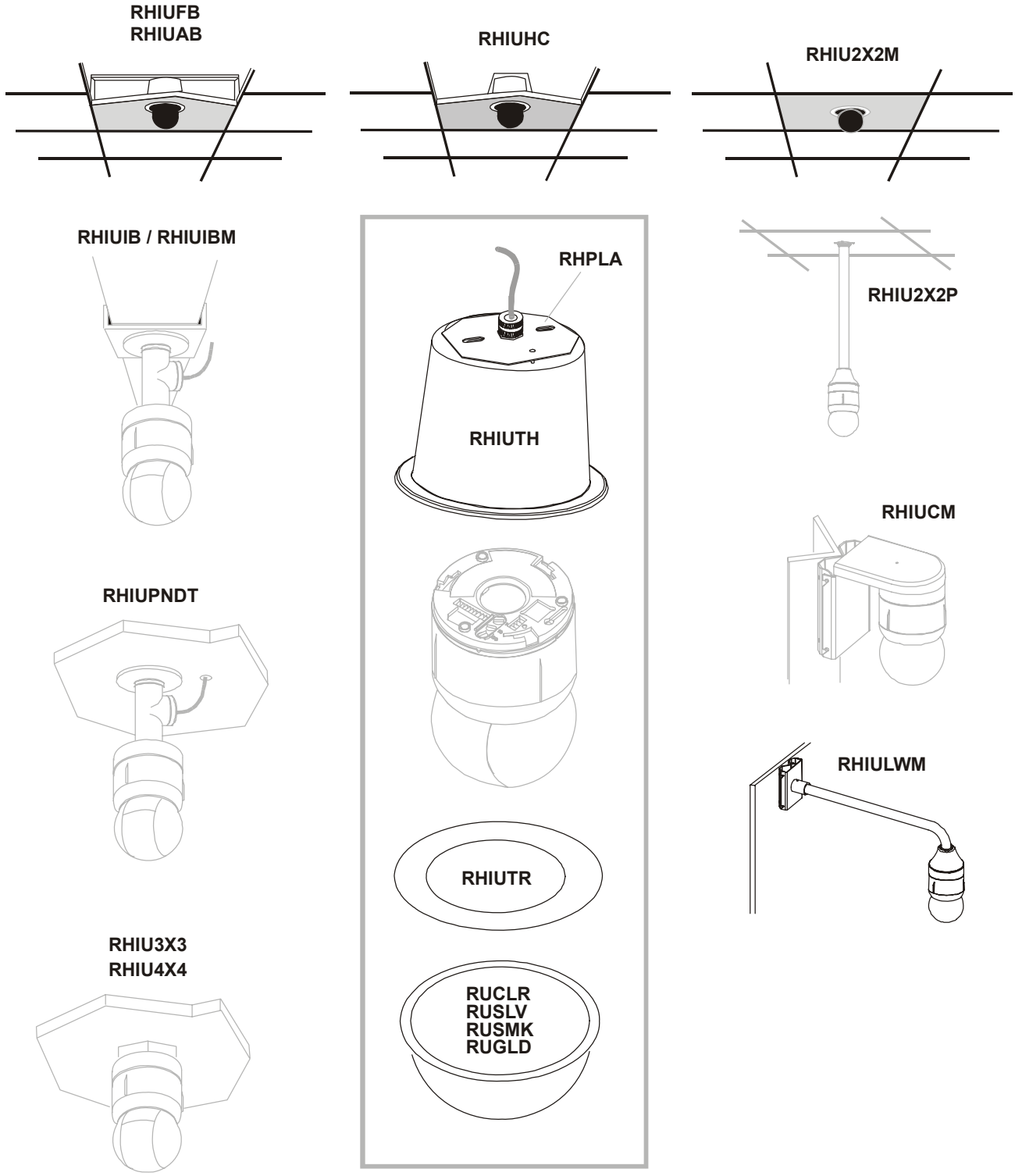
* Option in white, but can be painted to match decor.
† Top hat housing/dome assembly also mounts to structure.

Wall Mounting

RHIUCM*	Wall mount with corner feature Attaches dome to attach to a wall, inside corner, or outside corner.
RHIULWM*†	Long 0.6m (24in) wall mount Positions dome away from wall to enable it to see over furniture, shelving, and displays. This mounting structure attaches to the wall, inside corner, or outside corner.

* Option in white, but can be painted to match decor.
† Top hat housing/dome assembly also mounts to structure.

Figure 4. Indoor mounting structures (optional)



Outdoor Mounting (Optional)

Note: This document does not include outdoor installation and service instructions. For these instructions, see RHODUL Outdoor Housing Install Guide 8200-0184-10.

The camera dome attaches to outdoor walls and ceilings using an RHODUL outdoor housing (Figure 5) and an ROENDC end cap connected to one of the following optional mounting structures (Figure 7)

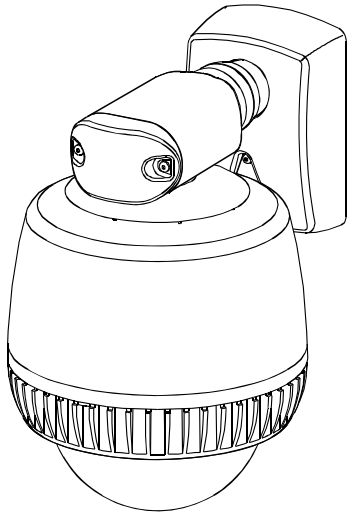
- RHOTR Over Roof Mount
- RHOTRF Over Roof Floor Mount
- RHOPN Pendant Mount
- RHOWPA Pole Mount
- RHOSW/RHOLW Wall Mount
- RHOWCA Corner Bracket.

The outdoor housing contains a pre-installed mounting base, a cooling fan for hot weather, a heater for cool weather and to prevent icing, and surge protection circuitry to protect against lightning strikes.

An environmental PC board is used to pre-wire cables. A round spring-finger connector on the board makes electrical contact with the housing and eyeball assembly as it connects to the base.

Note: Do not use the I/O board (designed for indoor use) in place of the environmental board.

Figure 5. RHODUL outdoor housing (optional)



SpeedDome Housing Adapter Bracket (Optional)

An RHSDA adapter bracket (Figure 6) enables the dome to fit into SpeedDome indoor and outdoor housings. Locking pins in the bracket enable the dome to swing out for servicing or removal.

Figure 6. RHSDA adapter bracket (optional)

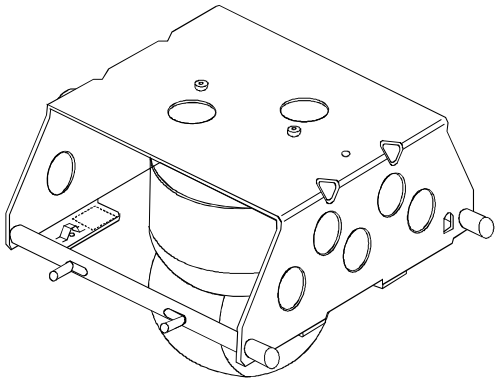
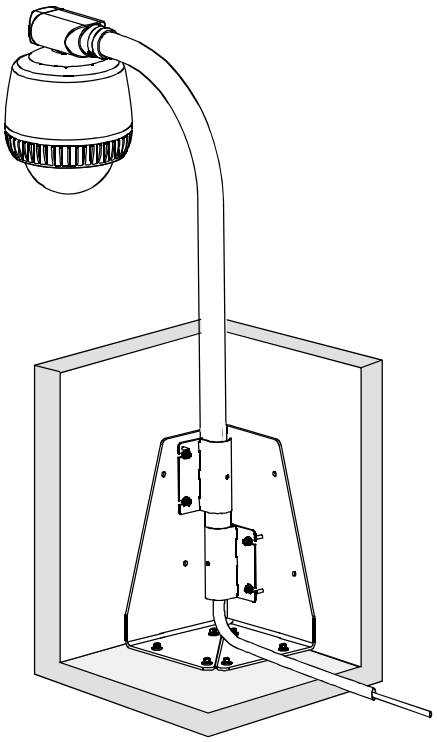
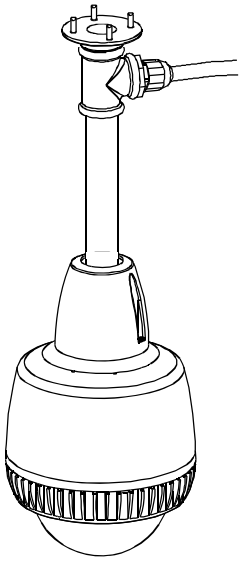


Figure 7. Outdoor mounting structures (optional)

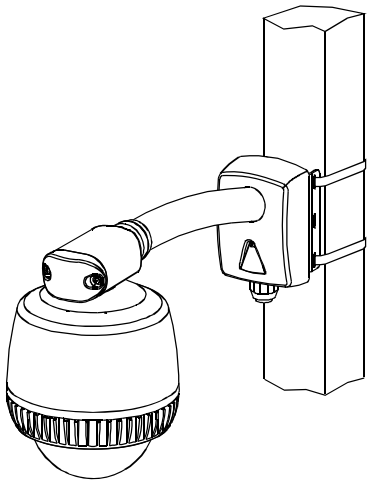
RHOTR over roof mount (shown with RHOTRF bracket)



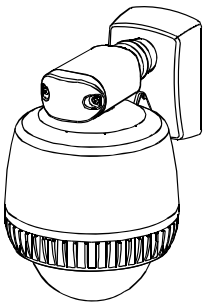
RHOPN pendant mount



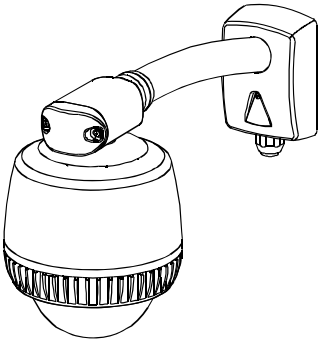
RHOWPA pole mount



RHOSW/RHOLW wall mount

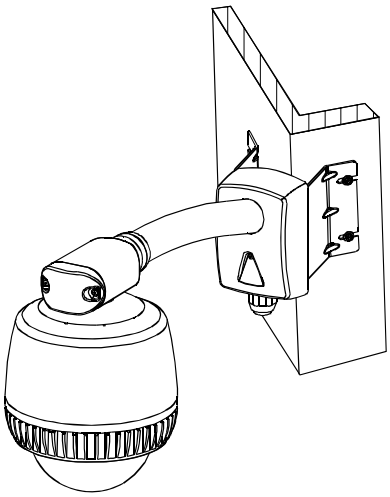


RHOSW



RHOLW

RHOWCA corner bracket (shown with RHOLW mount)



Cable Requirements

Data Cable

The table below shows requirements for SensorNet, RS-422, and Manchester networks. For more information about communication protocols and cable networks, see Communication Protocols and Cable Networks, 8000-2573-19.

Data cable requirements

	SensorNet	RS-422	Manchester
Cable type	1 unshielded, twisted pair*	2 shielded, twisted pair*	1 shielded twisted pair**
Wire gauge	22 AWG	22 AWG	18 AWG
Connection	Non-polarized	Polarized	Polarized
Max. devices on line	32	10	3

* Power, data, and video cables can be ordered separately or within a composite cable that can be ordered in various lengths. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order parts through your distribution network.

Note: If you order cable from an outside source, wire colors may be different.

** Belden 88760 (plenum), or Belden 8760 cable (non-plenum) cable is recommended. Plenum-rated cables must be used in indoor ceilings used for environmental air return (called "other air space" in the National Electrical Code). Order cable directly from Belden by calling 1-800-235-3361.

Power Cable

For the camera dome to operate properly, line voltage must not go below the worst-case low line voltage shown in the following table. Make cable lengths as short as possible to minimize affects of low line voltages. As shown in the table, maximum cable length depends on the Class 2 LPS (low voltage) ac source (such as a J-box) and the worst-case low line voltage. These lengths are for Sensormatic composite cables, which use 18 AWG ac power wires.

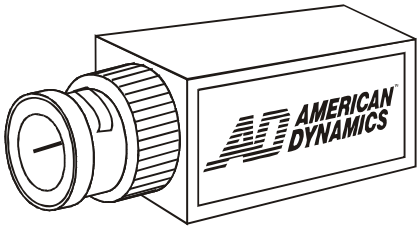
Note: Typically, distances are used that provide a 15% margin between nominal and low line conditions. For example, if the nominal voltage is 120Vac, restrict cable length to that associated with 100Vac (0.85 x 120).

Worst-case ac line voltages

Indoor Dome AC Power Source	Worst-Case Low Line V	Meters (Feet)
28 VA Transformer 5604-0006-01	117	180 (600)
	100	130 (430)
	90	80 (270)
50 VA Transformer 5604-0044-01	117	180 (600)
	100	150 (500)
	90	90 (300)
1-position SensorNet RJ1SNUD	117	210 (700)
	100	130 (430)
	90	100 (325)
1-position SensorNet RJ1SNUD-1	117	210 (700)
	100	130 (430)
	90	100 (325)
6-position SensorNet Indoor J-Box RJ6SN	117	300 (1000)
	100	230 (750)
	90	160 (530)
	240	300 (1000)
	200	230 (750)
	180	160 (530)
10-Position RS-422 Indoor 120V/60Hz J-Box RJ860AP	117	275 (900)
	100	200 (650)
	90	130 (430)
10-Position RS-422 Indoor 240V/60Hz J-Box RJ860AP1	240	275 (900)
	200	200 (650)
	180	130 (430)
Universal Transformer 0300-0914-01	117	200 (650)
	100	130 (430)
	90	90 (300)
Universal Transformer 0300-0914-03	240	200 (650)
	200	130 (430)
	180	90 (300)

Twisted Pair Adapter

Figure 8. Twisted Pair Adapter

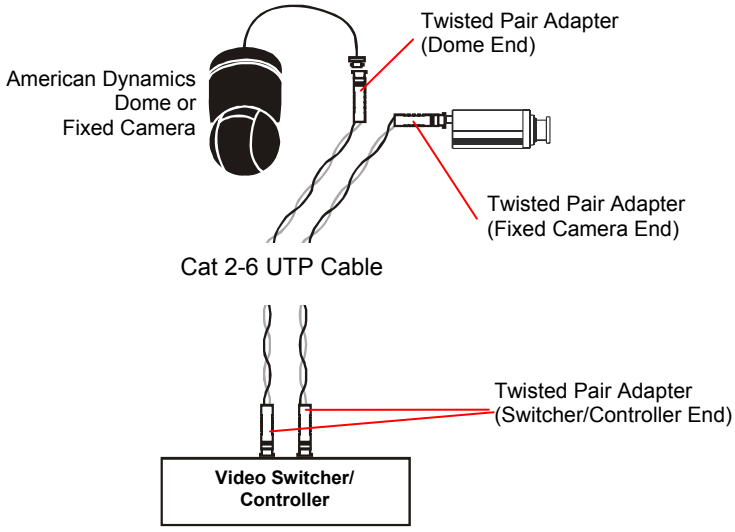


The supplied ADACTP01BNC Twisted Pair Adapter (Figure 8) is used to transmit video or video with UTC (up-the-coax) dome control signals over unshielded twisted pair (UTP) cables, point-to-point, up to 300m (1000ft).

The adapter mounts directly to the video source or receiver without additional cabling and uses Category 2-6 twisted pair wires to transmit the video and dome control signals. The adapter does not require power.

One adapter is supplied. If used, another adapter must be ordered for the connection at the other end of the cable. Figure 9 shows twisted pair cable connections. See installation guide 8200-0298-01 for details.

Figure 9. Cabling overview

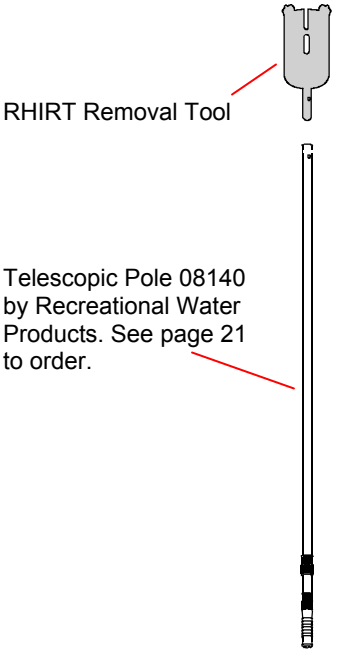


Install/Removal Tool for Base with I/O Board

The install/removal tool (Figure 10) enables you to connect or disconnect the housing and eyeball assembly from the base with I/O board, and to attach/detach skirts and bubbles to a top-hat housing, without the need for a ladder. The tool attaches to a telescopic pole (purchased separately). See page 18.

CAUTION: Do not use this tool to connect the dome to the base without I/O board.

Figure 10. RHIRT indoor install/removal tool



Power-Up Routine

After power is connected to the dome, the dome performs the following homing routine.

1. After a few seconds, the camera lens tilts up into the housing and eyeball assembly.
2. The lens tilts downs until it looks at the floor.
3. Eyeball pans slowly.
4. Lens tilts up 90° (home position).

Once the lens is in its home position, you can then use the controller to call up the camera and control it.

Synchronizing Domes

To prevent picture rolling when switching from camera to camera, all domes can be synchronized to a 50Hz or 60Hz ac source. A V-phase adjustment at the control console enables the dome to sync to any line phase.

Diagnostic LEDs

If a base without I/O board is used, LEDs in the housing and eyeball assembly enable you to check for power and data.

If a base with I/O board is used, LEDs on the underside of the mounting base enable you to check for power and data. If an RS-422 network is used, other LEDs on the board indicate that wiring is correct, reversed, open, or grounded.

Warnings and Cautions

Please review the following warnings and cautions before you begin installation or service.

WARNINGS

WARNING!

ALWAYS USE:

- Proper safety equipment for the location and type of installation.
- Proper lift equipment to reach the installation.
- Safety features of the lift equipment.

BE SURE:

- Electrical power is not connected to the dome when connecting wires. Dome will move when power is applied.
- Electrical power is not connected to nearby fixtures that you might touch during installation.

WARNING!

DO NOT install this camera dome where highly combustible or explosive products are stored or used.

WARNING!

This dome runs on 24Vac. DO NOT connect line voltage to this dome.

North America power requirements: In North America, this device is intended to be supplied from a Class 2 power supply. For outdoor installations, use Class 3 wiring techniques, liquid-tight conduit, or liquid-tight pipe.

This installation should be made by a qualified service person and should conform to all local codes.

WARNING!

EU power requirements: This product runs on 24Vac. In the EU, it is intended to be powered from a Limited Power Source. A limited power source is a certified source of SELV, and if inherently limited, with 8 amps maximum output current, and a maximum of 100VA available; or if not inherently limited, fused with a maximum value of 3.3 Amps, meeting section 2.11 of IEC950, and a maximum of 250VA available. The power supply can be obtained through Sensormatic or through another source where the provider can furnish the verification. This is required to assure electrical safety in the product.

Stromanforderungen in der EU: Dieses Produkt wird mit 24 V Wechselstrom betrieben. In der EU ist es für den Betrieb durch eine begrenzte Stromquelle vorgesehen. Eine begrenzte Stromquelle ist eine zertifizierte SELV-Quelle (Schutzkleinspannung), bei inhärenter Begrenzung mit einem maximalen Ausgangsstrom von 8 A und 100 VA maximaler Verfügbarkeit, bei nicht inhärenter Begrenzung mit einer maximalen Sicherung von 3,3 A gemäß Abschnitt 2.11 der IEC950 und 250 VA maximaler Verfügbarkeit. Das Netzteil kann über Sensormatic oder eine andere Quelle bezogen werden, wobei der Anbieter den Nachweis der Konformität bereitstellen sollte. Dies ist zur Gewährleistung der elektrischen Sicherheit des Produktes erforderlich.

CAUTIONS

- Cables
  - Do not run data and power cables adjacent to or in the same conduit as line voltage mains power.
  - SensorNet 485 networks require 22 AWG unshielded cable. Do not exceed 32 devices per cable run.
  - RS-422 networks require 22 AWG shielded cable. Do not exceed 10 devices per cable run.
  - Manchester networks require 18 AWG shielded cable. Do not exceed 3 devices per cable run.
  - Always terminate the dome's CPU board (JW1), if the camera dome is connected at the end of a cable run or is connected to an I/O base.
  - When using the base without I/O board and wiring cables directly to the dome, ALWAYS connect the video cable to the dome before you connect the 9-pin cable (which contains power). If you connect the 9-pin cable first, you risk shorting delicate electronics near the connector.
- I/O PC board (when used).
  - If a cable clamp is on this board, remove it, as it could damage cable connectors in the housing during assembly.
  - Use a jeweler's 2.5mm (0.1in) slotted screwdriver to tighten connector screws. Do not over tighten these screws.
  - Keep the dust cover to protect contacts should the environmental PC board need to be removed from the housing.
- When connecting the housing and eyeball assembly to an outdoor housing:
  - Remove both slot covers to keep the camera from overheating.
  - Keep cables entering the housing away from the heater assembly.
  - Place tubing around the BNC connectors to avoid shorting their metal surface to the outdoor housing.
  - Check heater fans. Both fans must be on to prevent overheating.

  Note: For further information, see installation instructions shipped with the outdoor housing.
- If disassembling the dome:
  - Dome contains electrostatic-sensitive devices! Use a ground strap when handling PC boards.
  - Once disassembled, parts of housing and eyeball assembly are "extremely fragile" and may break. Use extreme care!

Indoor Installation

This section explains how to connect the housing and eyeball assembly to a:

- Mounting base without I/O board (page 11)
- Mounting base with I/O board (page 15)

Items You Will Need

You should have on hand the following tools and parts:

- ❑ Install/Removal tool to attach and detach domes and bubbles without a ladder from mounting bases with I/O boards.
- ❑ Base kit:
  - RUIOB/RUWIOB (base with I/O board), or
  - RUPTB/RUWPTB (standard base without I/O board).
- ❑ SpeedDome Ultra VII housing and eyeball assembly, 0101-0041-XX. The -XX determines the type of camera used.

  -01 = Color 22X NTSC (for dome with black finish)
  -02 = Color 22X PAL (for dome with black finish)
  -03 = BW 22X EIA (for dome with black finish)
  -04 = BW 22X CCIR (for dome with black finish)
  -05 = Color 22X NTSC (for dome with white finish)
  -06 = Color 22X PAL (for dome with white finish)
- ❑ SpeedDome Ultra VIIE housing and eyeball assembly, 0101-0120-XX. The -XX determines the type of camera used.

  -01 = Color 23X NTSC (for dome with black finish)
  -02 = Color 23X PAL (for dome with black finish)
  -03 = Color 23X NTSC (for dome with white finish)

Other Preparations

To ensure a smooth and successful installation, you must:

- Have electrical work comply with latest national electrical code, national fire code, and all applicable local codes and ordinances.
- Coordinate work with other trades to avoid interference.
- Verify existing site conditions and coordinate with the owner's representative and appropriate utilities as required.
- Obtain copies of all related plans, specifications, shop drawings and addenda to schedule and coordinate related work.
- Thoroughly review the project to ensure that all work meets or exceeds the above requirements. Bring alleged discrepancies to the attention of the CCTV Project Coordinator.

Connecting to the Mounting Base without I/O Board

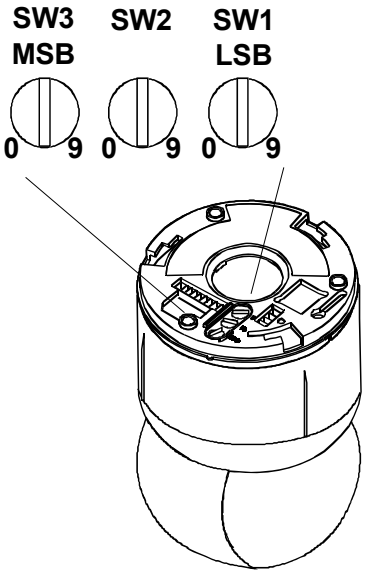
This procedure explains how to connect the housing and eyeball assembly to a mounting base without I/O board.

WARNING: Ensure that ac power and electrical signals are off during wire connections!

1. Set the dome address (Figure 11).

   At the top of the housing are three address switches. From left to right, set the switches to the desired address. For example, for address 166, set SW3 to 1, SW2 to 6, and SW1 to 6).

Figure 11. Setting address switches

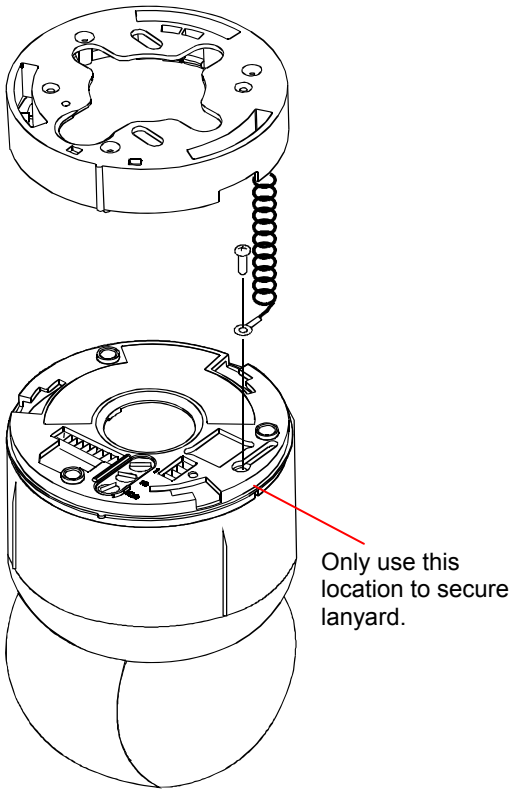


Use the following addresses for the protocols shown:

PROTOCOL	SW3	SW2	SW1
AD Manchester, Range: 001—064	0	x	x
PELCO "P," 4800 baud RS-422, Range: 001—099	0	x	x
Sensormatic, 4800 baud RS-422, Range: 001—063, 065—099	0	x	x
Sensormatic, RS-422 Address 64 is used for global broadcasts	0	6	4
SensorNet, Range: 001—099	0	x	x
VICON, 4800 baud RS-422, Range: 001—099	0	x	x
SensorNet, Range: 100—254	1	x	x
	2	x	x
Address 255 is used for global broadcasts	2	5	5
Dept. of Transportation (NTCIP), 4800 baud RS-422, Range: 301—399	3	x	x
Dept. of Transportation (NTCIP), 9600 baud RS-422, Range: 401—499	4	x	x
Dept. of Transportation (NTCIP), 19.2K baud RS-422, Range: 501—599	5	x	x
PELCO "P," 2400 baud RS-422, Range: 601—699	6	x	x
PELCO "P," 9600 baud RS-422, Range: 701—799	7	x	x
Reset **HITACHI** VK-xxxx(E)R camera block from 38.4K to 4800 baud (SpeedDome Ultra VIIE 0100+ feature only).	8	3	0
PANASONIC UTC	8	9	0
Tyco UTC	8	9	1
PELCO UTC (Origins, Standard, & Extended)	8	9	3
RS-422, LED diagnostic mode for dome wiring installations without the I/O Board	9	0	0
Manufacturing Use**,** Range: 901—999	9	x	x

2. Attach the safety lanyard to the cap on the housing and eyeball assembly (Figure 12). Use the M3x6 screw supplied with the lanyard.

Figure 12. Attaching safety lanyard



3. WITH POWER OFF, connect the video cable (Figure 13).
   a. Connect BNC of video micro coax cable 6003-0170-01 to BNC of video cable.
   b. Feed cable through access hole in base.
   c. Press the micro coax connector into the mating receptacle in the top of the housing and eyeball assembly. A firm snap indicates a tight connection.

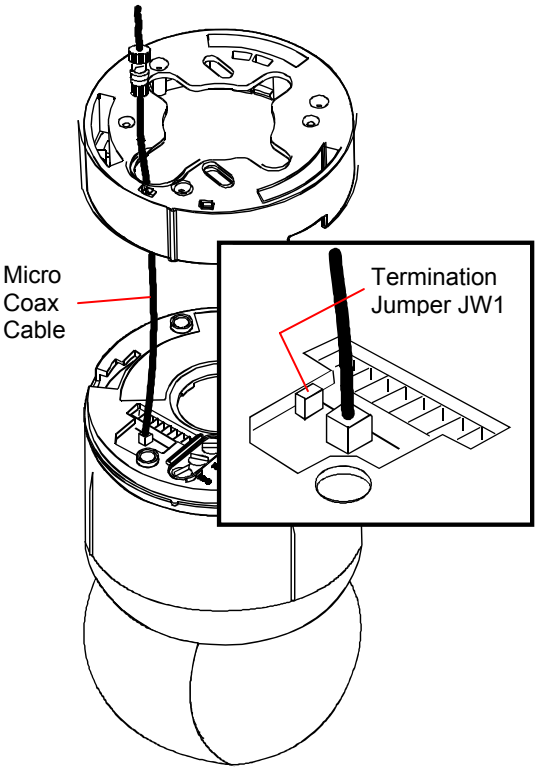
4. For the dome at the end of a daisy chain, set termination jumper JW1 on the dome CPU board (Figure 13) to “terminated.”

Position of dome in communications line…	Setting	Pins
Between other devices	Unterminated	1-2*
End of communications line	Terminated	2-3

* Pins 1-2 are closest to 9-pin connector.

Note: You may need a small slotted screwdriver to gently pry the jumper loose. Be careful not to damage the underlying PC board.

Figure 13. Video cable connection and termination jumper location



5. Connect the 9-pin plug (data and power) to the 9-pin receptacle (Figure 14). If using a Pelco Coaxitron or Panasonic UTC protocol, no data wires are connected, just power.

CAUTION: DO NOT connect the 9-pin plug unless you have performed step 3 first!

a. Feed cables through the access hole in the base.

b. Connect data and power wires to the 9-pin plug (refer to charts below).

c. Insert the plug into the mating receptacle in the top of housing and eyeball assembly.

Manchester data and power connections. Order data cable 88760 (plenum) or 8760 (non-plenum) from Belden by calling 1-800-235-3361.

Pin	Color	Designation
1	White	Manchester (–)
2	Black	Manchester (+)
3	Black	24Vac
4	Red	Ground
5	White	24vac
6-9	—	Not used.

RS-422/Pelco P data and power connections

Pin	Color	Designation
1-2	—	Not used.
3	Black	24Vac
4	Red	Ground
5	White	24Vac
6	Orange	RS-422 Data In High (+)
7	Green	RS-422 Data In Low (–)
8	Yellow	RS-422 Data Out High (+)
9	Brown	RS-422 Data Out Low (–)

SensorNet data and power connections

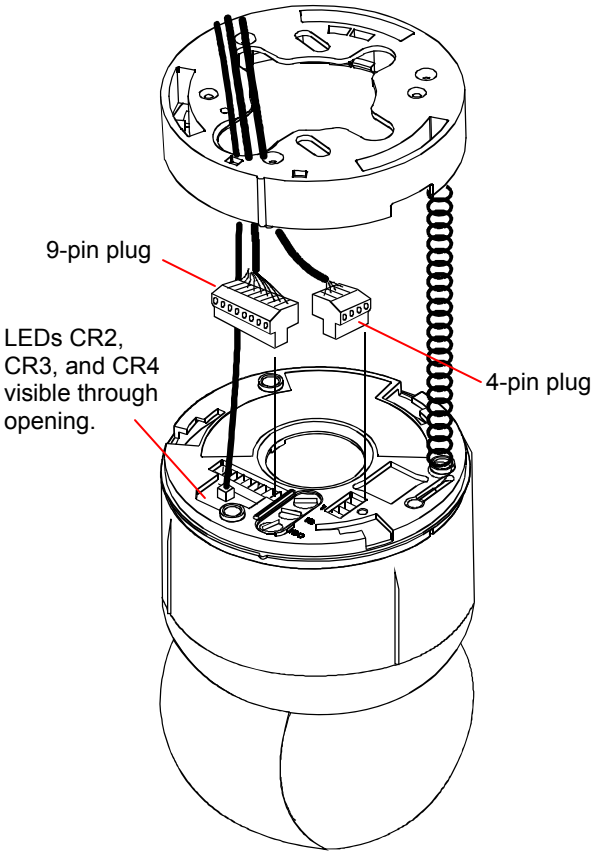
Pin	Color	Designation
1	Orange	SensorNet (unshielded)
2	Yellow	SensorNet (unshielded)
3	Black	24Vac
4	Red	Ground
5	White	24Vac
6-9	—	Not used.

6. Connect the 4-pin plug (alarm input/output) to the 4-pin receptacle (Figure 14).
   a. Feed the cable through the access hole in the base.
   b. Connect alarm wires to the 4-pin plug (refer to chart below).
   c. Insert the plug into the mating receptacle in the top of the housing and eyeball assembly.

Alarm connections

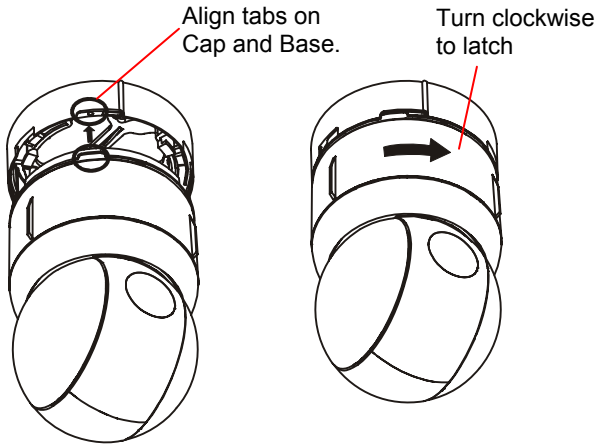
Pin	Color	Designation
1	—	+12Vdc
2	—	Alarm Out
3	—	Alarm In
4	—	Common

Figure 14. Cable connections (Manchester requires separate cables for data and power)



7. Connect the housing and eyeball assembly to the base (Figure 15) by aligning the Cap and Base tabs and then turning clockwise until you hear a click.

Figure 15. Connecting housing and eyeball assembly to base (cables and lanyard not shown)



8. Apply power and wait a few seconds for the dome to begin its homing routine. The homing routine indicates that address was placed into dome memory and that dome is ready for programming.

   Note: If the homing routine does not occur or if the dome does not respond to commands, check the cable wiring by referring to the LED response tables in Appendix A.

Connecting to a Mounting Base with I/O Board

This procedure explains how to connect the housing and eyeball assembly to a mounting base with I/O board.

WARNING: Ensure that ac power and electrical signals are off during wire connections!

Referring to Figure 16:

CAUTION: Detach and discard cable clamp if I/O board has one. If not removed, clamp can damage 9-pin connector in housing and eyeball assembly when you attempt to connect it to base.

1. Set termination jumper JW1 on the dome CPU board to “terminated”.

Position of dome in communications line…	Setting	Pins
Between other devices	Unterminated	1-2*
End of communications line	Terminated	2-3

* Pins 1-2 are closest to 9-pin connector.

Note: You may need a small slotted screwdriver to gently pry jumper loose. Be careful not to damage underlying PC board.

2. Connect video cable (or Twisted Pair Adapter) to BNC connector P8 on I/O board.

3. Connect Manchester, RS-422, or SensorNet 485 data wires to connector P1. If using a Pelco Coaxitron or Panasonic UTC protocol, no data wires are connected, just power.

Manchester data connections. Order data cable 88760 (plenum) or 8760 (non-plenum) from Belden by calling 1-800-235-3361.

Pin	Color	Designation
1-4	—	Not used.
5	Black	Manchester (+)
6	White	Manchester (–)

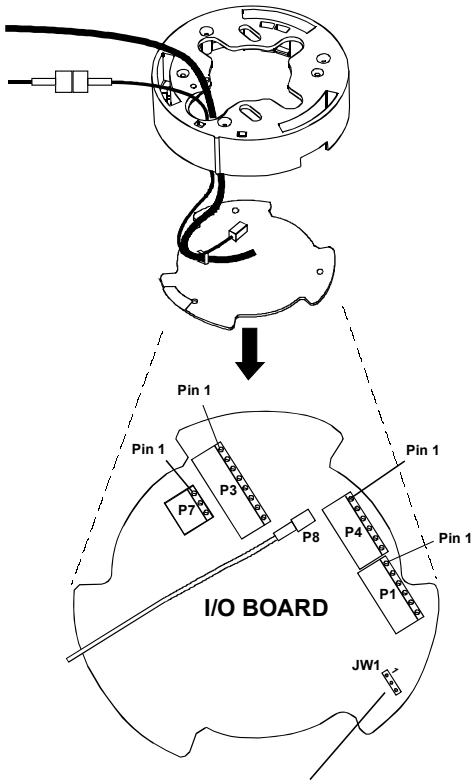
RS-422 data connections

Pin	Color	Designation
1	Orange	RS-422 Data In High (+)
2	Green	RS-422 Data In Low (–)
3	Yellow	RS-422 Data Out High (+)
4	Brown	RS-422 Data Out Low (–)
5-6	—	Not used.

SensorNet data connections

Pin	Color	Designation
1-4	—	Not used.
5	Orange	SensorNet (unshielded)
6	Yellow	SensorNet (unshielded)

Figure 16. Electrical connections



JW1 Terminations

PINS	FUNCTION
1-2	Unterminated
2-3	Terminated

4. Connect the alarm output cable, if used, to the P3 connector.

Pin	Color	Designation
1	—	12Vdc (100mA max.)
2	—	12Vdc (100mA max.)
3	—	Output P0 (40mA sync. max.)
4	—	Output P1 (40mA sync. max.)
5	—	Output P2 (40mA sync. max.)
6	—	Output P3 (40mA sync. max.)
7	—	Ground
8	—	Ground

5. Connect the alarm input cable, if used, to the P4 connector.

Pin	Color	Designation
1	—	Alarm 3 input (3.5mA sink)
2	—	Alarm 2 input (3.5mA sink)
3	—	Alarm 1 input (3.5mA sink)
4	—	Alarm 0 input (3.5mA sink)
5	—	Ground
6	—	Ground

6. Connect power to P7 connector.

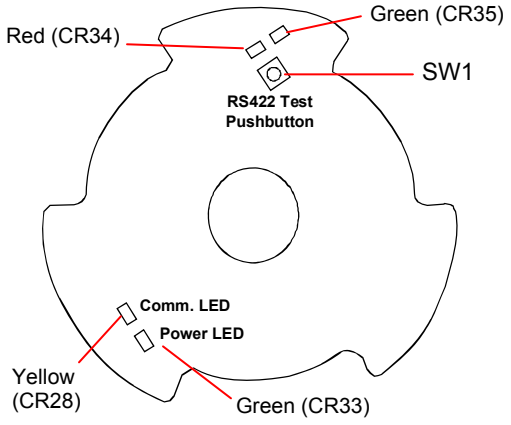
Pin	Color	Designation
1	Black	24 Vac
2	Red	Ground
3	White	24 Vac

7. Reattach the I/O board.
8. Connect power to the base.
9. Check LEDs on the I/O board to verify power and data are reaching the dome (Figure 17).
   a. The green (ac power) LED glows steadily when ac power is applied.
   b. *For Manchester or SensorNet:* The yellow (comm.) LED glows steadily (Manchester) or blinks (SensorNet). If this LED is off, then probably one or both communication wires are open or both are shorted together.

      For RS-422: Press and hold data test switch SW1 and observe nearby red (CR34) and green (CR35) LEDs; they indicate the following:

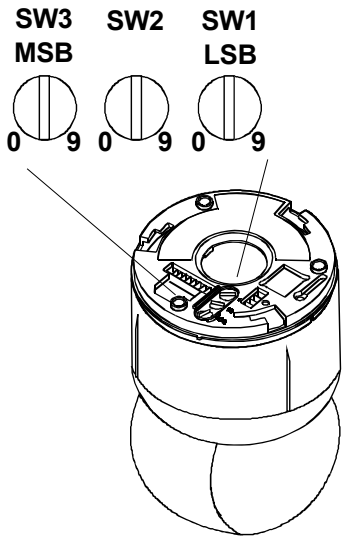
Constant green, Blinking red	RS-422 line correctly wired.
Constant green, No red	RS-422 "Data In—" shorted to ac ground.
Constant red, Blinking green	"Data In +/—" wires reversed.
Blinking red, Green off	"Data In +" shorted to ac ground.
Both LEDs off	"Data In +/—" wires shorted or open.

Figure 17. Test switch/LEDs on I/O board



10. Set the dome address (Figure 18).

Figure 18. Setting address switches

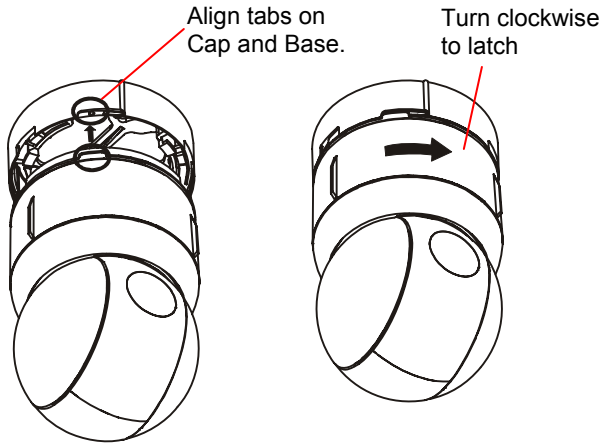


Use the following addresses for the protocols shown:

PROTOCOL	SW3	SW2	SW1
AD Manchester, Range: 001—064	0	x	x
PELCO "P," 4800 baud RS-422, Range: 001—099	0	x	x
Sensormatic, 4800 baud RS-422, Range: 001—063, 065—099	0	x	x
Sensormatic, RS-422 Address 64 is used for global broadcasts	0	6	4
SensorNet, Range: 001—099	0	x	x
VICON, 4800 baud RS-422, Range: 001—099	0	x	x
SensorNet, Range: 100—254	1	x	x
	2	x	x
Address 255 is used for global broadcasts	2	5	5
Dept. of Transportation (NTCIP), 4800 baud RS-422, Range: 301—399	3	x	x
Dept. of Transportation (NTCIP), 9600 baud RS-422, Range: 401—499	4	x	x
Dept. of Transportation (NTCIP), 19.2K baud RS-422, Range: 501—599	5	x	x
PELCO "P," 2400 baud RS-422, Range: 601—699	6	x	x
PELCO "P," 9600 baud RS-422, Range: 701—799	7	x	x
Reset **HITACHI** VK-xxxx(E)R camera block from 38.4K to 4800 baud (SpeedDome Ultra VIIE 0100+ feature only).	8	3	0
PANASONIC UTC	8	9	0
Tyco UTC	8	9	1
PELCO UTC (Origins, Standard, & Extended)	8	9	3
RS-422, LED diagnostic mode for dome wiring installations without the I/O Board	9	0	0
Manufacturing Use**,** Range: 901—999	9	x	x

11. Connect the housing and eyeball assembly to the base (Figure 19) by aligning the Cap and Base tabs and then turning clockwise until you hear a click.

Figure 19. Connecting housing and eyeball assembly to base (cables and lanyard not shown)



12. Wait a few seconds for dome to begin its homing routine. The homing routine indicates that the address was placed into the dome memory and that the dome is ready for programming.

Using the Install/Removal Tool

CAUTION: Do not use this tool to connect the dome to the standard base (without I/O board)

Used only when the dome is connected to a base having an I/O board, the RHIRT install/removal tool eliminates the need for a ladder during routine service. The tool can be used to:

- Detach skirt or bubble from housing, if used. The skirt or bubble remains attached to the housing during service.
- Connect/Disconnect dome from base with I/O board.
- Reattach skirt or bubble.

Telescopic Pole Required to Use Tool

The tool attaches to a telescopic pole that is similar to the type used to clean swimming pools. The pole should be 5 feet-5 inches to 15 feet-5 inches long and have a 1.170 -inch inside diameter to accept the 1.125-inch diameter stem of the tool. If this pole cannot be obtained locally, contact the following manufacturer:

Recreational Water Products
627 E. College Ave.
Decatur, GA 33030

Ask for product code 08140
UPC: 0-14746-58140-2

Procedure

Referring to Figure 20, maneuver the stem of the tool into the top of the pole until it snaps in place.

TO ATTACH SKIRT OR BUBBLE:

Use the tool to push up on the bubble to secure it in place. Magnets secure the bubble. Lower the pole.

TO DETACH SKIRT OR BUBBLE:

Lifting the pole up at an angle, use one of the hooks on the tool to catch one of the notches at the side of the dome and pull down. The T-lanyard will prevent the skirt or bubble from falling.

TO CONNECT DOME:

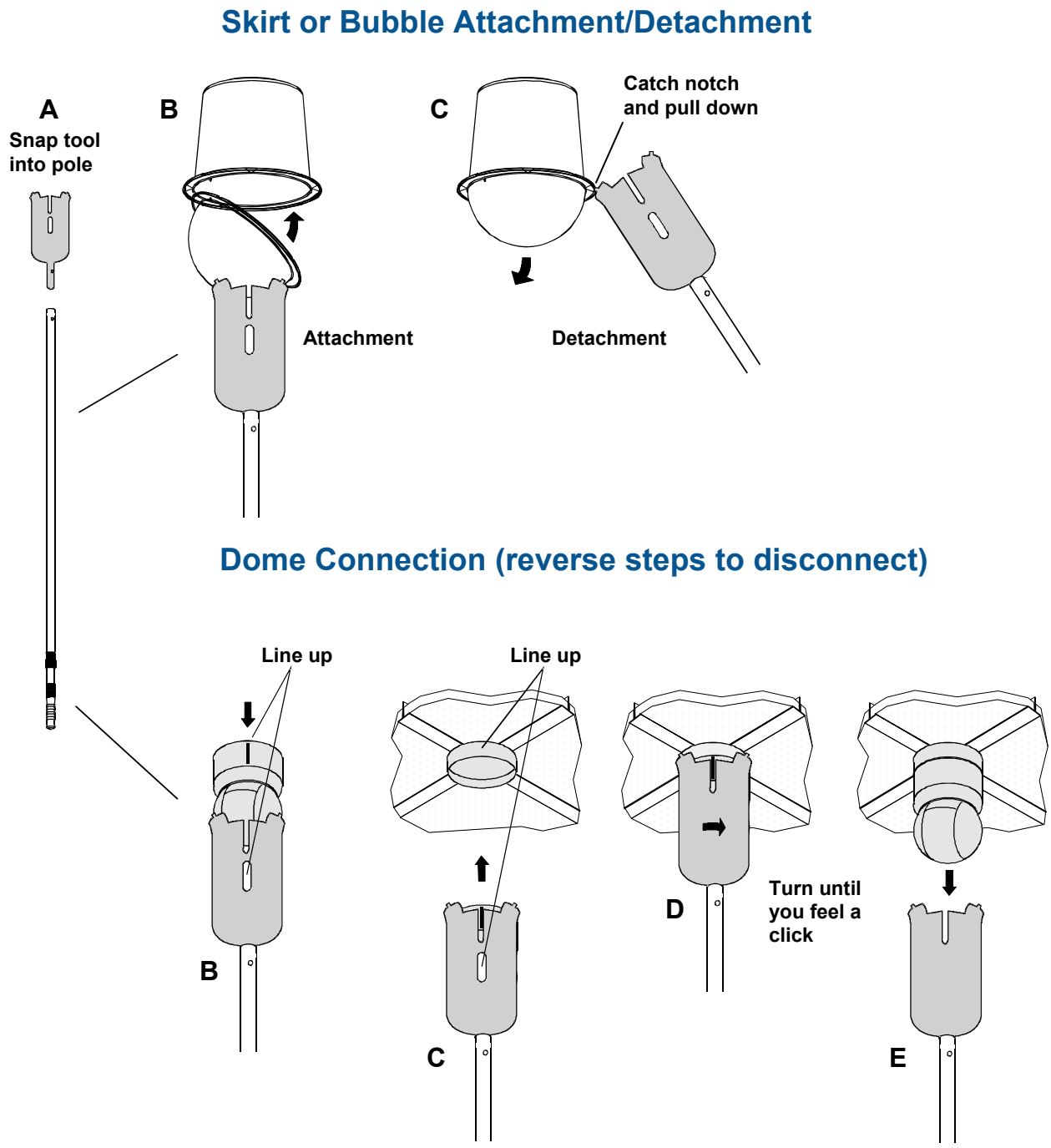
1. Insert dome "eyeball down" into tool's receptacle. Fins on dome mate with slots in tool. Use fins to properly align dimple at top of dome with label on tool.
2. Align label on tool with logo on I/O board in base. Push dome up into place.
3. Turn dome clockwise until it clicks.
4. If power is applied, dome should begin its "homing" routine.
5. Lower pole.

TO DISCONNECT DOME:

1. Raise pole and insert dome "eyeball down" into tool's receptacle.
2. Fins on dome mate with slots in tool.
3. Turn dome counterclockwise until it unlocks.
4. Lower pole "vertically" to prevent camera dome from falling out.

   CAUTION: Turning pole horizontally as it is lowered can cause camera dome to fall out of tool and possibly break on floor.
5. Remove dome for service.

Figure 20. How to use the install/removal tool



Troubleshooting Indoor Domes

CAUTION: This troubleshooting section is for indoor camera domes only! To troubleshoot outdoor domes, see installation and service manual shipped with the outdoor housing.

This chapter contains information on:

- Routine troubleshooting
- Detailed troubleshooting
- Disassembling the dome.

IMPORTANT!

1. Try routine troubleshooting first! Use this procedure to isolate the problem without disassembling the housing and eyeball assembly (the base with the I/O board is field repairable).

   CAUTION: DO NOT troubleshoot if the dome functions but does not pan or tilt (see step 2).

2. If you cannot isolate the problem, or the dome functions but does not pan or tilt, contact your sales representative for repair instructions.

3. If you have no choice but to repair the housing and eyeball assembly. Follow the detailed troubleshooting procedure, but use extreme care.

   CAUTION: Once disassembled, parts of the housing and eyeball assembly are "extremely fragile" and may break. Proceed using extreme care!

Items You Will Need

You should have on hand the following items:

- Phillips-head screwdriver
- Small slotted screwdriver
- 2.5mm (0.1in) slotted screwdriver (for wire connections). Wider blade widths can damage connectors.
- Socket wrench with 5in extension and 5.5mm, 6mm, 8mm, and 10mm sockets
- 14-18 AWG and 20-22 AWG wire strippers
- Install/Removal tool to connect/disconnect dome to indoor bases with I/O boards, and to attach/detach skirts and bubbles—without a ladder.

Routine Troubleshooting

Use this procedure if:

- Dome does not respond to commands
- Dome does not produce video
- Quality of the video is poor
- Dome has no lens control.

CAUTION:

- DO NOT use this procedure if the dome functions but does not pan or tilt (see step 2 on page 20).
- If an I/O board is used, use a ground strap when handling the board. When shipping a base having an I/O board, place the dust cover over the spring finger connector to protect it.
- DO NOT over tighten connector screws on the I/O board; they are delicate. Use a 2.5mm (0.1in) slotted screwdriver. Wider blade widths can damage connectors.

Procedure

Follow steps until the problem is corrected.

1. Check video on monitor (a, b, or c).
   a. No video? Go to step 2.
   b. Contrast or color off?
      YES Contact your sales representative for repair instructions.
      NO Go to step 2.
   c. Video rolls when switching between monitors?
      YES Use the video controller or switcher to synchronize video vertical sync phases of all domes to ac line. For specific instructions, see installation and service manual for the controller or switcher.
      NO Go to step 2.

2. Check ac power and video connections at J-box. Are 24Vac and/or video signal absent?

   YES Correct problem at J-box.

   NO Go to step 3.

3. Detach dome from base and examine address switches. Are they set correctly?

   YES If dome still doesn't respond, contact your sales representative for repair instructions. If you must repair the dome, see "Detailed Troubleshooting", next.

   NO Set correct address and reattach housing and eyeball assembly.

Steps 4-9 are only for bases with I/O boards!

If the mounting base DOES NOT contain an I/O board, stop here and contact your sales representative for repair instructions.

4. Isolate problem to housing and eyeball assembly or base by attaching dome to another base with I/O board. Does dome display video or respond to commands?

   YES Problem is likely cable connections or I/O board if used. Go to step 5.

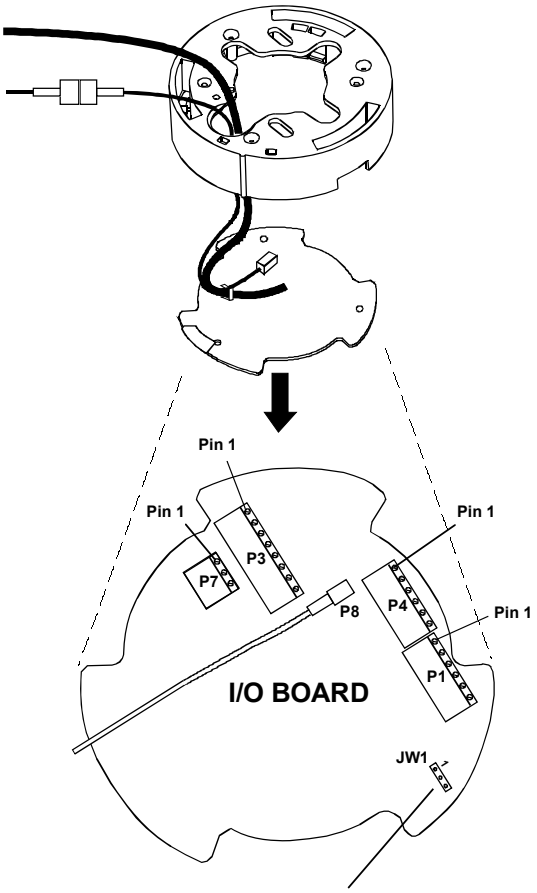
   NO Contact your sales representative for repair instructions

5. Verify coaxial video cable is securely connected to coax of I/O board (Figure 21). Is cable disconnected?

   YES Connect cable.

   NO Go to step 6.

Figure 21. I/O board connector and jumper locations



JW1 Terminations

PINS	FUNCTION
1-2	Unterminated
2-3	Terminated

6. Observe green power LED on I/O board (Figure 21). Is green LED off or not on steady?

   YES Verify 24Vac cable is properly attached. If OK, replace I/O board or contact your sales representative for repair instructions.

   NO Go to step 7.

P7 Connector (AC in)

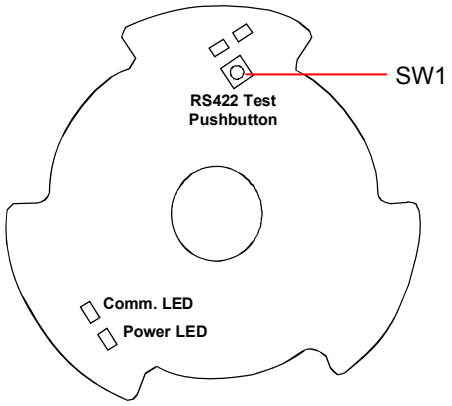
Pin	Color	Designation
1	Black	24 Vac
2	Red	Ground
3	White	24 Vac

7. Observe yellow comm. LED (CR28) on I/O board (Figure 22). Is the LED on or flashing?

   YES Go to step 8.

   NO Verify cable is properly attached by referring to table in step 9, page 17. If OK, replace I/O board or contact your sales representative for repair instructions.

Figure 22. I/O board switch and LED locations



P1 connector (Manchester data)

Pin	Color	Designation
1-4		Not used.
5	Black	Manchester (+)
6	White	Manchester (–)

P1 connector (RS-422 data)

Pin	Color	Designation
1	Orange	RS-422 Data In High (+)
2	Green	RS-422 Data In Low (–)
3	Yellow	RS-422 Data Out High (+)
4	Brown	RS-422 Data Out Low (–)
5-6	—	Not used.

P1 connector (SensorNet 485 data)

Pin	Color	Designation
1-4	—	Not used.
5	Orange	SensorNet 485
6	Yellow	SensorNet 485

8. If using RS-422 network and an I/O board is used, check comm. line connections by pressing and holding data test switch SW1 (Figure 22) and observing nearby red (CR34) and green (CR35) LEDs. These LEDs indicate the following:

Constant green, Blinking red	Comm. line correctly wired.
Constant green, No red	"Data In -" shorted to ground.
Constant red, Blinking green	"Data In +/ -" wires reversed.
Blinking red, Green off	"Data In +" shorted to ground.
Both LEDs off	"Data In +/ -" wires shorted or open.

9. Check spring finger connector on I/O board by connecting housing and eyeball assembly to original base to verify contact between spring fingers and CPU board (under cap). Does dome produce video and respond to commands?

   YES Spring fingers may not have seated properly. Reconnect housing and eyeball assembly.

   NO Replace I/O board.

If routine troubleshooting did not solve the problem, the manufacturer strongly recommends you contact your sales representative for repair instructions.

If you must perform detailed troubleshooting, use extreme care when disassembling parts! See "Detailed Troubleshooting," next.

Detailed Troubleshooting

Use this procedure to determine if the problem is a simple cable connection or a major component.

To perform this procedure, you must open the housing and eyeball assembly. Refer to "Disassembling the Dome" on page 24.

CAUTION:

- DO NOT use this procedure if the dome functions but does not pan or tilt (see step 2 on page 20).
- If routine troubleshooting did not solve the problem, the manufacturer strongly recommends you contact your sales representative for repair instructions. If you must perform detailed troubleshooting, use extreme care when disassembling parts!
- When shipping a base with I/O board, place the dust cover over the spring fingers to protect them.
- Delicate connector screws on I/O board. DO NOT over tighten them! Use a 2.5mm (0.1in) slotted screwdriver. Wider blade widths can damage connectors.
- Dome contains electrostatic-sensitive PC boards. Use a ground strap when handling boards.

Procedure

1. Match symptom to one of the following criteria:
   - Dome functions but does not pan
   - Dome functions but does not tilt
   - Dome does not "home" or respond to commands even when attached to another dome's base and its address switches are set correctly (dead dome).
2. Choose a, b, or c to determine if problem is a cable connection or major component.
   a. Dome functions but does not pan.

      On CPU board, is pan motor ribbon cable attached to connector P4 and is metal side of its fingers towards contacts of connector?

      YES Replace CPU board. If this doesn't work, replace pan motor.

      NO Connect cable(s).

   b. Dome functions but does not tilt.

      On camera/lens board, is tilt motor cable attached to connector J3? Is slip ring cable attached to connector J2?

      YES Replace camera/lens board. If this doesn't work, replace tilt motor.

      NO Connect cable(s).

   c. Dome does not "home" or respond to commands (dead dome).

      On CPU board, is power supply cable attached to connector P3? Is slip ring cable attached to connector P2?

      YES Replace CPU board. If this doesn't work, replace power supply board.

      NO Connect cable(s).

Disassembling the Dome

CAUTION: Once disassembled, parts of dome housing and eyeball assembly are "extremely fragile" and may break. Use extreme care!

This section explains how to remove the following parts from the camera dome.

- CPU board, page 24
- Power supply, page 24
- Pan motor, page 25
- Slot covers, page 25
- Camera, page 26
- Eyeball, page 27
- Camera/Lens board, page 27
- Tilt motor, page 28.

This section also explains how to update and reprogram dome software (Page 29).

To order parts (authorized users only), see page 30.

Tools Required

- Phillips-head screwdriver.
- Small slotted screwdriver.

Removing the CPU Board

CAUTION: Electrostatic-sensitive device. Use a ground strap when handling CPU board.

Referring to Figure 23.

1. Remove cap.

   Remove three Phillips-head screws holding cap, then "gently" lift cap to one side.

2. Detach connectors.

   On CPU board, detach 8-pin power supply cable from connector P1, pan motor cable from connector P8, and 14-pin slip ring cable from connector P2.

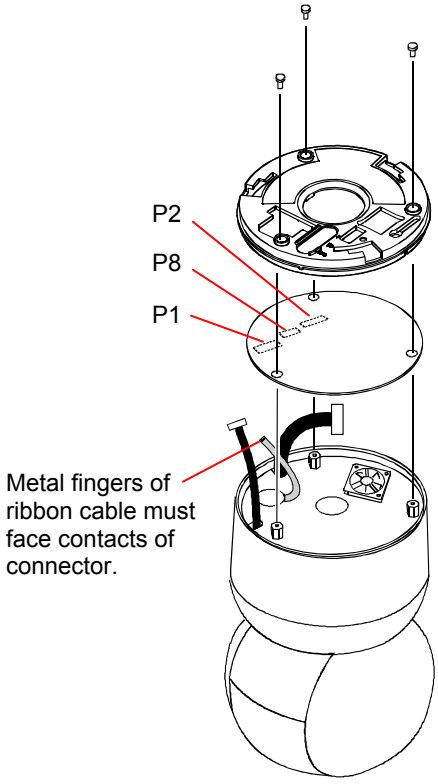
3. Remove CPU board.

   Push your finger through large finger connector hole in cap to pop out CPU board.

4. Reverse steps to reassemble.

   CAUTION: Do not to pinch wires! When inserting CPU board into housing, avoid pinching power supply cable wires against standoffs.

Figure 23. Removing the CPU board



Removing the P/S Board

CAUTION: Electrostatic-sensitive device. Use a ground strap when handling power supply board.

Referring to Figure 24.

1. Perform procedure "Removing the CPU Board" (page 24).
2. Remove metal shield.

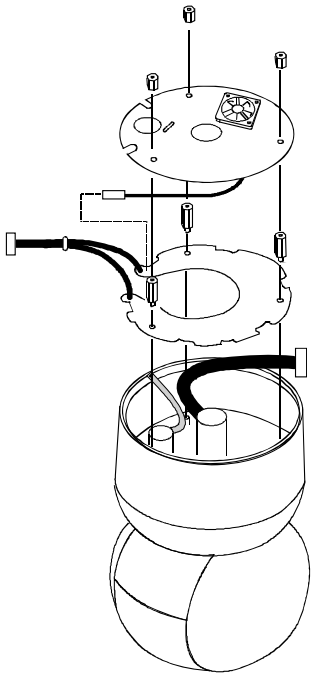
   Remove three standoffs holding metal shield, gently remove power supply cable grommet from shield, then "gently" lift shield out of housing.

   CAUTION: Do not pull delicate cables attached to power supply board.
3. Detach fan motor cable.

   Cable connects to connector CN3 on power supply board.
4. Remove power supply board.

   Remove three standoffs, then remove power supply board from housing.
5. Reverse steps to reassemble.

Figure 24. Removing the P/S board



Removing the Pan Motor

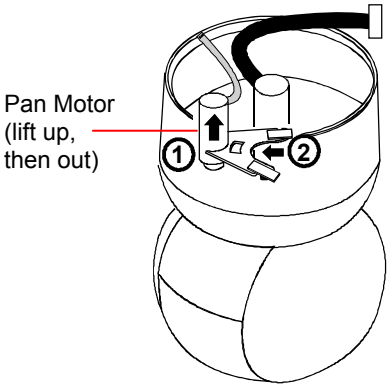
Referring to Figure 25.

1. Perform procedure "Removing the CPU Board" (page 24).
2. Perform procedure "Removing the P/S Board" (page 24).
3. Remove pan motor.

   Lift motor housing up as shown (1) to disengage motor from pan gear. Then pull motor bracket towards outside of housing (2) to remove.
4. Reverse steps to reassemble.

   CAUTION: When putting in a new motor, be careful to properly mesh motor and pan gears! Failure to do so can destroy both motor and pan gear. Verify pan gear turns freely!

Figure 25. Removing the pan motor



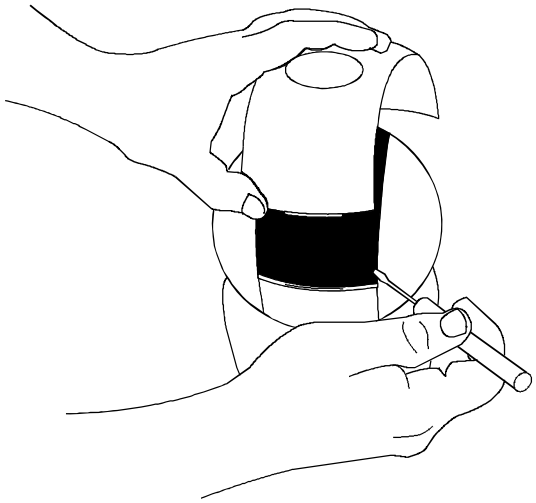
Removing the Slot Covers

1. Gently swivel eyeball to totally expose one of two slot covers (Figure 26).

   CAUTION: Swiveling fast can damage gears.

2. Insert small, thin-bladed screwdriver into space between cover and eyeball.
3. Gently pry off slot cover.
4. Gently swivel eyeball to totally expose remaining slot cover. With other cover removed, this cover can be easily removed.

Figure 26. Removing slot covers

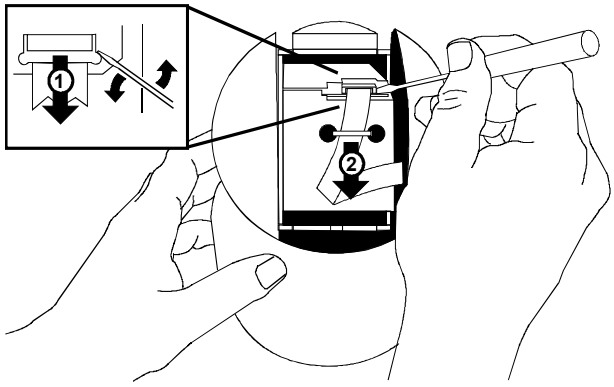


Removing the Camera

1. Perform procedure "Removing the Slot Covers" (page 25).
2. Remove ribbon cable from camera (Figure 27).

   Swivel camera yoke to expose camera connector. Then, using a small slotted screwdriver, 1) gently pry camera connector loose from camera, and 2) pull it down through cable tie wrap.

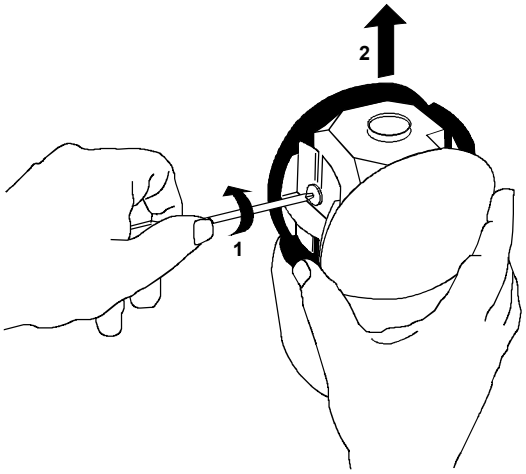
Figure 27. Removing the ribbon cable



3. Remove camera (Figure 28).

   1) Loosen the screw holding the camera tripod mount, then 2) carefully lift the camera out.

Figure 28. Removing the camera

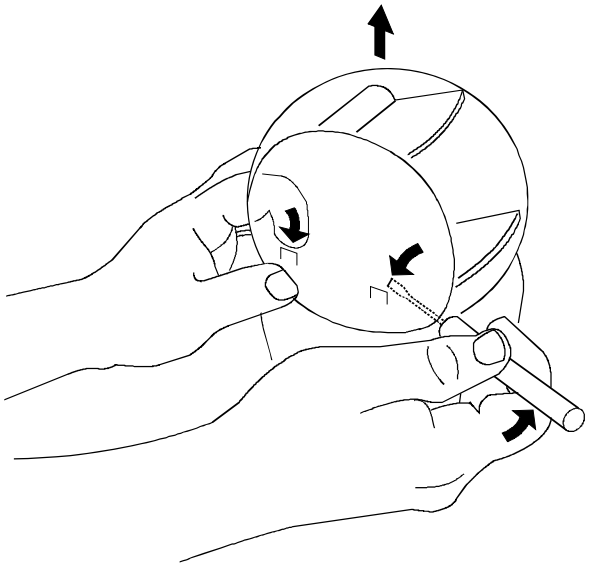


4. Reverse steps to reassemble. Ensure ribbon cable pins are inserted "face down".

Detaching the Eyeball

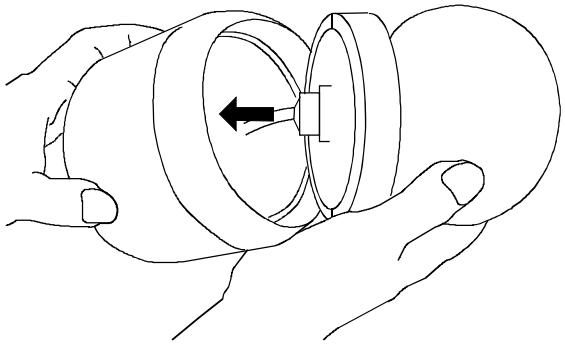
1. Perform procedure "Removing the Slot Covers" (page 25).
2. Perform procedure "Removing the Camera" (this page).
3. Detach eyeball from housing (Figure 29).
   a. Turn yoke to access tabs. One tab is more accessible than the other. Use your finger to press this tab while, simultaneously, using a small slotted screwdriver to press the other.
   b. While pressing tabs, push up on eyeball to detach it.

Figure 29. Loosening the eyeball



4. Detach slip ring connector (Figure 30).

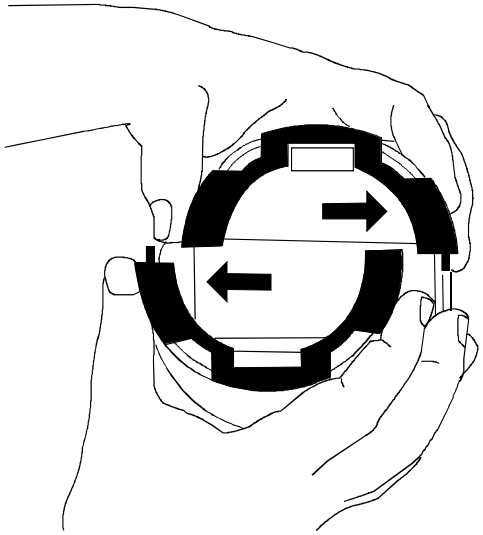
Figure 30. Detaching the eyeball



Removing the Camera/Lens Board

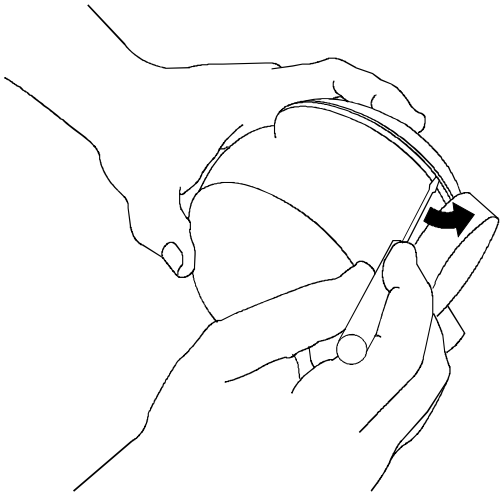
1. Perform procedure "Removing the Slot Covers" (page 25).
2. Perform procedure "Removing the Camera" (page 26).
3. Perform procedure "Detaching the Eyeball" (page 27).
4. Separate yoke brackets (Figure 31).

Figure 31. Separating the yoke brackets



5. Gently pry off yoke bracket covering camera/lens board to access bearing assembly (Figure 32).

Figure 32. Removing the yoke brackets



The following steps refer to Figure 33.

6. Access camera/lens board.

   To do this, loosen captive retaining screw holding bearing assembly in place and remove this assembly.

7. Remove cables from camera/lens board.

   a. Small amber ribbon cable is from tilt motor. Unplug this cable from connector J3 on camera/lens board.

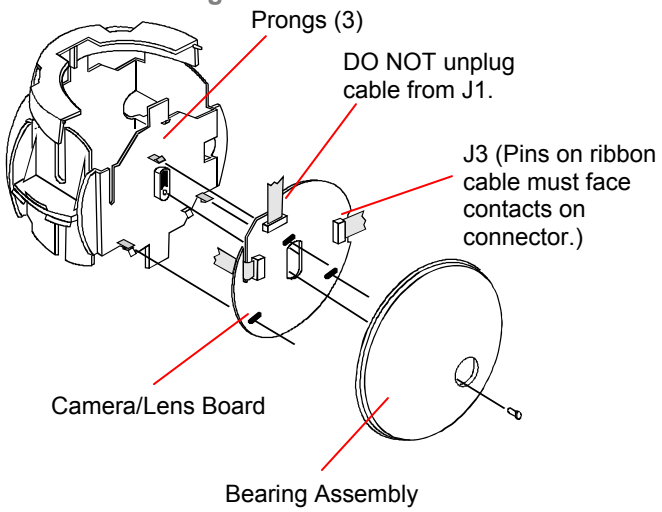
   b. Large gray ribbon cable is from slip ring connector. Unplug this cable from connector J2 on camera/lens board.

   DO NOT unplug small white ribbon cable from connector J1.

8. Push out on three prongs to detach camera/lens board.

9. Reverse steps to reassemble.

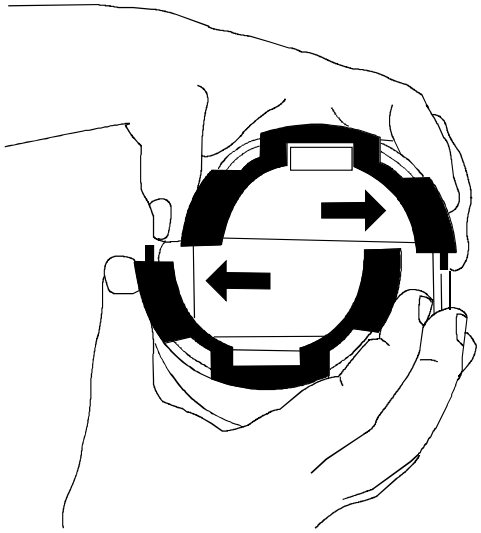
Figure 33. Removing the camera/lens board


Prongs (3)
DO NOT unplug cable from J1.
J3 (Pins on ribbon cable must face contacts on connector.)
Camera/Lens Board
Bearing Assembly

Removing the Tilt Motor

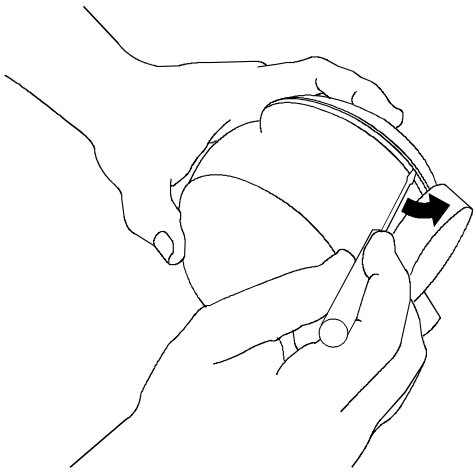
1. Perform procedure "Removing the Slot Covers" (page 25).
2. Perform procedure "Removing the Camera" (page 26).
3. Perform procedure "Detaching the Eyeball" (page 27).
4. Separate yoke brackets (Figure 34).

Figure 34. Separating the yoke brackets



5. Gently pry off yoke bracket covering pan gear assembly to access tilt cable assembly (Figure 35).

Figure 35. Removing the yoke brackets



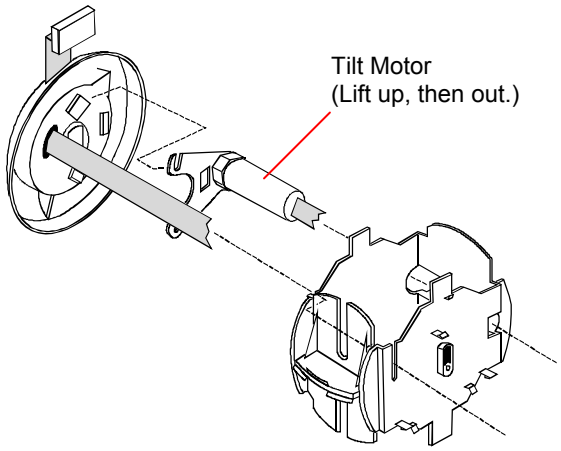
6. Access tilt motor.

   To do this, loosen captive retaining screw holding tilt cable assembly in place and gently remove this assembly.

7. Remove tilt motor (Figure 36).

   Lift motor housing up as shown to disengage motor from tilt gear. Then pull motor bracket towards outside of cable/tilt assembly to remove motor.

Figure 36. Removing the tilt motor



8. Reverse steps to reassemble.

   CAUTION: When installing a new motor, be careful to properly mesh motor and tilt gears! Failure to do so can destroy both motor and tilt gear. Verify tilt gear turns freely!

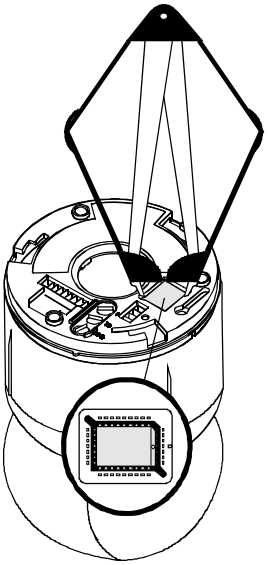
Updating/Reprogramming Dome Software

CAUTION: This procedure involves extracting a flash memory chip, an electrostatic-sensitive device. Use a ground strap when handling the chip.

To update or reprogram dome software:

1. Insert the chip extractor tool into the square access hole and squeeze the tool to extract the flash memory chip (Figure 37).
2. Reprogram the chip or replace it with a new one.
3. Align the dot on the chip with the indent on the socket; then push down on the chip to reinsert it.

Figure 37. Removing the flash memory chip



Illustrated Parts List

The following parts can only be ordered by authorized users. To become authorized, contact your sales representative. Parts in the tables below are shown in Figure 38.

Note: Not all of the parts, which are shown for clarity, are orderable. Parts are subject to change based on design improvements and availability.

Base Assembly without I/O Board

1	Mounting Base	0400-1146-01/-02
2	Video Cable Adapter, BNC to Micro	6003-0131-01
3	Plug, 4-Pin	2109-0572-04
4	Plug, 9-Pin	2109-0572-09
5	Lanyard	0500-8019-01
6	Screw, PH, M3 (Qty. 6 †)	5801-1051-120
7	Washer, Ext. Tooth, M3	5851-0200-041
8	Clip, Lanyard	0500-8046-01

Base Assembly with I/O Board

9	Mounting Base	0500-7257-02/-03
10	Ground Clip	0500-7293-01
11	I/O Board	0301-0546-01
12	Dust Cover	3100-0066-01

Housing Assembly

13	Screws, M3x8 PHP (Qty. 3†)	5801-1071-111
14	Cap	0500-8021-02/-03
15	CPU PC Board	0301-1548-02
16	Fan Cable Assy.	0650-2001-01
17	Standoff, M3x8Hx13L (Qty. 3†)	5899-0055-01
18	Fan Plate	0500-9850-01
19	Screw, Thdcut, M3.5 (Qty. 2 †)	5899-0008-01
20	Standoff, M3x6Hx19L (Qty. 3 †)	5887-1122-020
21	Power Supply PC Board	5606-0015-01
22	Slip Ring Assy.	2100-0005-01
23	Pan Motor	3501-0017-01
24	Housing	0500-7255-02/-03
25	Bearing Assy., Pan Gear	2510-0040-01
26	Skirt	0500-6710-01

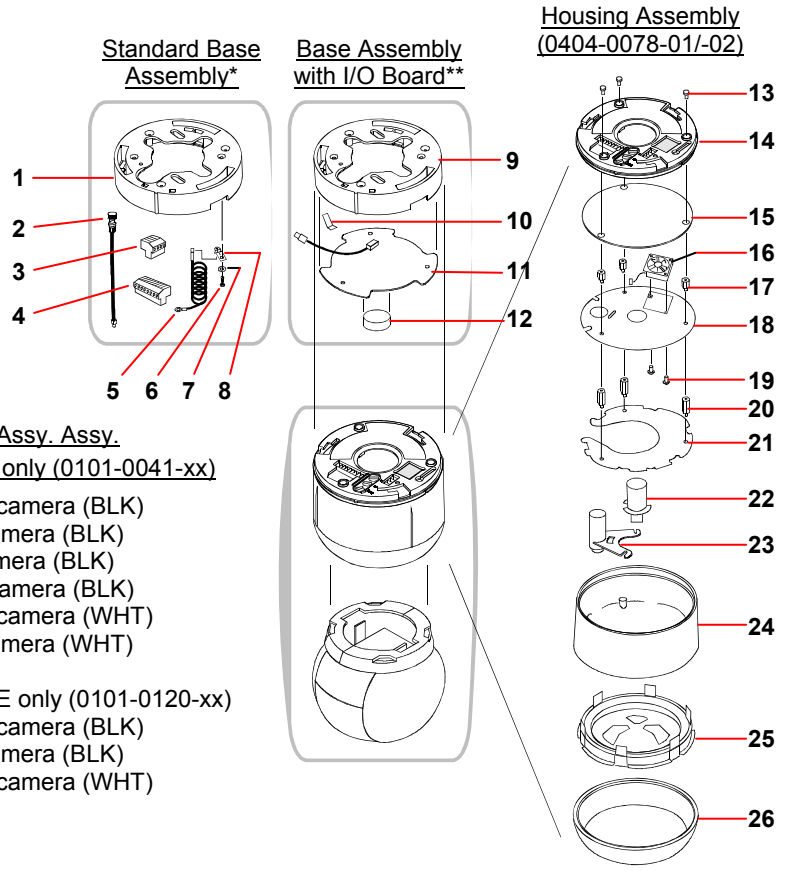
Eyeball Assembly

27	Tilt Motor	3501-0018-01
28	Slot Cover (No Lens)*	0500-8037-01/-02
29	Yoke, Camera	0500-7258-01
30	Camera/Lens PC Board	0301-0953-01
31	Bearing Assy., Lens Carriage	2510-0038-01
32	Yoke Bracket (Qty. 2 †)	0500-8038-01/-02
33	Cable Assy., Tilt	0650-1680-01
34	Camera, Color, 22x, NTSC	2003-0037-41
35	Camera, Color, 22x, PAL	2003-0037-42
36	Camera, B&W, 22x, EIA	2003-0037-43
37	Camera, B&W, 22x, CCIR	2003-0037-44
38	Camera, Color, 23x, NTSC	2003-0046-11
39	Camera, Color, 23x, PAL	2003-0046-12
40	Washer, Flat	2848-8100-08
41	Screw, 1/4-20 x 3/8	2802-7407-65
42	Screws, M2x3 (Qty. 4 †)	5801-0011-120
43	Tripod Mount	0500-6712-01
44	Slot Cover with Lens*	0400-1178-01/-02

* Items 28 and 44 are supplied with the final assembly, not the eyeball assembly.

† Item shipped in quantities of one. Order the quantity required.

Figure 38. Base, housing, and eyeball assembly



* RUPTB/RUWPTB

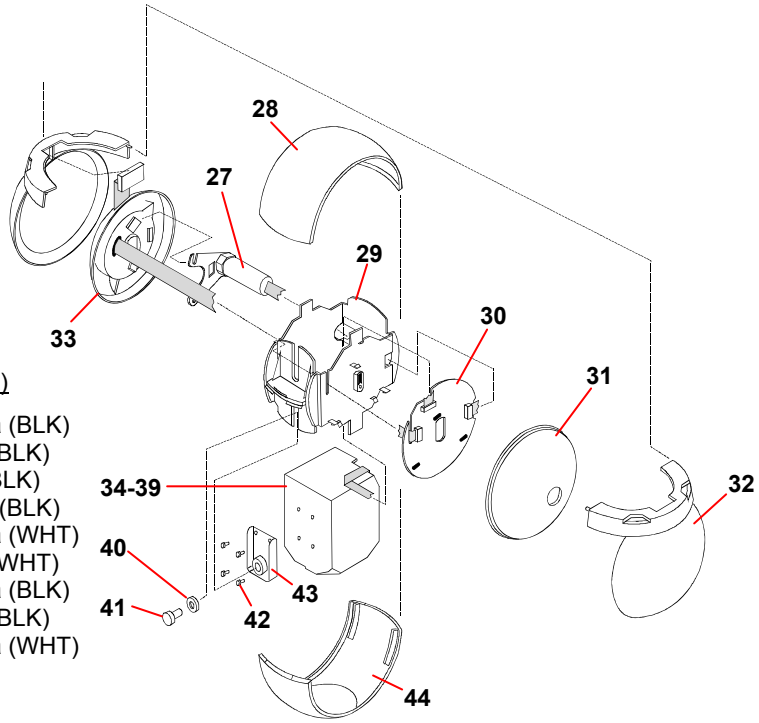
** RUIOB/RUWIOB

Housing and Eyeball Assy. Assy.

SpeedDome Ultra VII only (0101-0041-xx)

-01 Color 22X NTSC camera (BLK)
-02 Color 22X PAL camera (BLK)
-03 B&W 22X EIA camera (BLK)
-04 B&W 22X CCIR camera (BLK)
-05 Color 22X NTSC camera (WHT)
-06 Color 22X PAL camera (WHT)

SpeedDome Ultra VIIE only (0101-0120-xx)
-01 Color 23X NTSC camera (BLK)
-02 Color 23X PAL camera (BLK)
-03 Color 23X NTSC camera (WHT)



Eyeball Assy. (0404-0079-xx)

-01 Color 22X NTSC camera (BLK)
-02 Color 22X PAL camera (BLK)
-03 B&W 22X EIA camera (BLK)
-04 B&W 22X CCIR camera (BLK)
-05 Color 22X NTSC camera (WHT)
-06 Color 22X PAL camera (WHT)
-11 Color 23X NTSC camera (BLK)
-12 Color 23X PAL camera (BLK)
-15 Color 23X NTSC camera (WHT)

Specifications-Indoor Dome

Operational

Pan/Tilt:

- Manual Pan Speed ..... 0.2°-100° per second (scaled to zoom position)
- Manual Tilt Speed ..... 0.25°-100° per second (scaled to zoom position)
- Preset Pan/Tilt Speed ..... 220° per second max.
- Pan Travel ..... 360° continuous rotation
- Tilt Travel ..... >90°
- Pan/Tilt Accuracy ..... ±0.5°

22X Camera Zoom Functions:

- Optical Zoom 22X
- Digital Zoom 11X
- Zoom Pause ..... 22X selectable or 33X default
- Total Zoom 242X
- Zoom Stop ..... 44X, 66X, 88X (default), 110X, 132X,154X, 176X, 198X, 220X, 242X
- Zoom/Focus Accuracy ..... ±0.5%

23X (Day/Night) Camera Zoom Functions:

- Optical Zoom 23X
- Digital Zoom 10X
- Zoom Pause ..... 23X selectable or 35X default
- Total Zoom 230X
- Zoom Stop ..... 46X, 69X, 92X (default), 115X, 138X,161X, 184X, 207X, 230X
- Zoom/Focus Accuracy ..... ±0.5%

Auto Synchronization:

- Line Locked ..... Remote V-phase adjustment
- Internal ..... Built-in sync generator

Address Range 1-255

Number of Presets:

- VM16 / ADTT16 ..... 96 with SensorNet 485 4 with RS-422 **
- VM32 / AD32 ..... 96 with SensorNet 485 4 with RS-422 **
- AD2150 ..... 64 with Manchester 16 with RS-422 *
- VM96 ..... Virtual with RS-422 or SensorNet 485 (max. 9999 across all available domes on system)
- VM168 / AD168 ..... 64 with Manchester, RS-422, or SensorNet 16 with RS-422 *
- AD2050 ..... 64 with Manchester 16 with RS-422 *
- MegaPower 48 ..... 64 with Manchester, SensorNet, and RS-422, 96 stored at host
- MegaPower LT ..... 96 with SensorNet 485, 96 with UTC
- MegaPower 48 Plus ..... 64 with Manchester, 96 with SensorNet and RS-422 (dome or host stored)

* Using AD2083-02B

** Using RCSN422

Quick View™ Access Time ..... <1 second to position. Full zoom in <4 seconds. Focus on VM16, VM32 and VideoManager systems is <1 second. Focus on VM96 and RV2715 systems is <7 seconds

Programmable Patterns ..... Up to 16 depending on host

Program Storage ..... 256 Kbytes of Flash memory

Data Storage ..... 128 Kbytes of SRAM

Menu Languages ..... English, French, German, Spanish, Italian, and Portuguese

Electrical

Input Voltage ..... 18-30Vac, 50/60 Hz UL Class 2 LPS

Design Tolerance ..... 16-36Vac, 50/60 Hz

Power Consumption ..... 16W max.

Current ..... 0.85A max.

Allowable Drop Out 100ms

Power On In-Rush Current 1.5A

Surge Protection:

Video Output ..... Low capacitance Zener suppressor 6.5V, 1500W

Power Line ..... TVS rated at 60V, 1.5 joules, 250A 8/20µs impulse

RS-422 ..... TVS rated at 9.8V/1A, 20V/25A, 500W, 8/20µs impulse

Manchester/
SensorNet 485 ..... Gas discharge tube rated at: 8/20µs impulse discharge current of 10kA, ten 8/20µs impulse discharge current of 5kA Isolation transformer coupled 2000Vrms. PTC fuse protects transformer. TVS rated at 9.8V/1A, 20V/25A, 500W, 8/20µs impulse

Alarm Input ..... TVS rated at 9.8V/1A, 20V/25A, 500W, 8/20µs impulse

Alarms Inputs/Control Outputs:

When no I/O board is used:

Inputs..... 1 dry contact/3.5mA sink

Outputs..... 1 open collector driver @ 12Vdc, 40mA

When I/O board is used:

Inputs..... 4 dry contacts/3.5mA sink

Outputs..... 4 open collector drivers @ 12Vdc, 40mA

Environmental

Operating Temperature ..... –10° to 50°C (14° to 122°F)

Relative Humidity..... 0 to 95% non-condensing

Storage Temperature..... –20°C to 65°C (–4°F to 149°F)

Mechanical

Height 20.8cm (8in)

Eyeball Diameter 12cm (4.7in)

Weight:

Housing and Eyeball..... 1.36kg (3 lbs)

Base (standard)..... 0.09kg (0.20 lbs)

Base (with I/O board)..... 0.16kg (0.35 lbs)

Lens and Bubble Densities

Eyeball Lens f0

Bubbles:

RUCLR (Clear) f0

RUSLV (Silver) ..... f1.5 to f2

RUSMK (Smoke)..... f0.5

RUGLD (Gold)..... f1.5 to f2

Specifications-22X Camera

Type ..... Interline transfer 1/4" CCD array

Scanning Area..... 3.2 (H) x 2.4 (V) mm

Scanning System ..... 2:1 interlace

Video Out ..... 1.0 Vp-p/75 ohms composite

Signal-to-Noise..... 50 dB (typical)

Color Camera Only

Horizontal Resolution ..... 470 lines at center

Minimum Illumination ..... 0.3 lux (AGC On, 20 IRE) 0.02 lux with 1/4 s open shutter

White Balance ..... Through-the-Lens (TTL) Automatic Tracing White balance (ATW)

NTSC:

Effective Pixels ..... 768 (H) x 494 (V) pixels

Scanning..... 525 lines, 60 fields, 30 frames

Horizontal 15.734kHz

Vertical..... 59.9Hz

PAL:

Effective Pixels ..... 752 (H) x 582 (V) pixels

Scanning..... 625 lines, 50 fields, 25 frames

Horizontal 15.625kHz

Vertical..... 50Hz

Monochrome Camera Only

Horizontal Resolution ..... 500 lines at center

Minimum Illumination ..... 0.008 lux (AGC On, 20 IRE) 0.004 lux with 1/4 s open shutter

White Balance ..... Through-the-Lens (TTL) Automatic Tracing White balance (ATW)

EIA:

Effective Pixels ..... 768 (H) x 494 (V) pixels

Scanning..... 525 lines, 60 fields, 30 frames

Horizontal 15.734kHz

Vertical..... 59.9Hz

CCIR:

Effective Pixels ..... 752 (H) x 582 (V) pixels

Scanning..... 625 lines, 50 fields, 25 frames

Horizontal 15.625kHz

Vertical..... 50Hz

Lens Design

Type .....Aspherical
Focal Length .....4 to 88mm
Aperture .....f1.6 (wide angle) f3.8 (telephoto)

Viewing Angle (equivalent to 8-80 mm on 1/2in CCD array, or 11-110 mm on 2/3in CCD array):

4mm .....47.0°(H) x 35.2°(V)
88mm .....2.2°(H) x 1.6°(V)

Specifications-23X Camera

Type.....Interline transfer 1/4in CCD array
Scanning Area .....3.2 (H) x 2.4 (V) mm
Scanning System.....2:1 interlace
Video Out.....1.0 Vp-p/75 ohms composite
Signal-to-Noise .....50 dB (typical)
Horizontal Resolution.....470 lines at center
Minimum Illumination .....0.5 lux (AGC On, 20 IRE) 0.03 lux with 1/4 s open shutter 0.01 lux in IR mode 0.009 lux in IR mode with 1/4 s open shutter
White Balance .....Through-the-Lens (TTL) Automatic Tracing White balance (ATW)

NTSC:

Effective Pixels.....724 (H) x 494 (V) pixels
Scanning .....525 lines, 60 fields, 30 frames
Horizontal.....15.734kHz
Vertical 59.9Hz

PAL:

Effective Pixels.....724 (H) x 582 (V) pixels
Scanning .....625 lines, 50 fields, 25 frames
Horizontal.....15.625kHz
Vertical 50Hz

Lens Design:

Type .....Aspherical
Focal Length .....3.6 to 82.8mm
Aperture .....f1.6 (wide angle), f3.7 (telephoto)

Viewing Angle (equivalent to 8-80 mm on 1/2in CCD array, or 11-110 mm on 2/3in CCD array):

3.6mm .....54.0°(H) x 40.5°(V)
82.8mm .....2.5°(H) x 1.9°(V)

Field-of-View Formulas:

$$\frac{3.2\text{mm}^{*} \times \text{distance from camera (m)}}{\text{Focal length (mm)}} = \text{Horizontal view (m)}$$

$$\frac{2.4\text{mm}^{**} \times \text{distance from camera (m)}}{\text{Focal length (mm)}} = \text{Vertical view (m)}$$

* Horizontal scanning area of pickup device (mm) in camera.
** Vertical scanning area of pickup device (mm) in camera.

Example: Wide angle view with lens at 6mm and viewed object at 10m.

$$\frac{3.2\text{mm} \times 10\text{m}}{6\text{mm}} = 5.33\text{m Horizontal view (m)}$$

$$\frac{2.4\text{mm} \times 10\text{m}}{6\text{mm}} = 4.0\text{m Vertical view (m)}$$

Declarations

Regulatory Compliance

REG ID ..... VP SDU

Emissions ..... 47 CFR, Part 15, Class A
ICES-003 Class A
EN55022 Class A
EN61000-3-2
EN61000-3-3

Immunity EN50130-4

Safety UL1950
CSA C22.2 No. 950
EN60950
IEC 60950

FCC COMPLIANCE: This equipment complies with Part 15 of the FCC rules for intentional radiators and Class A digital devices when installed and used in accordance with the instruction manual. Following these rules provides reasonable protection against harmful interference from equipment operated in a commercial area. This equipment should not be installed in a residential area as it can radiate radio frequency energy that could interfere with radio communications, a situation the user would have to fix at their own expense.

EQUIPMENT MODIFICATION CAUTION: Equipment changes or modifications not expressly approved by Sensormatic Electronics Corporation, the party responsible for FCC compliance, could void the user's authority to operate the equipment and could create a hazardous condition.

Other Declarations

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MDR/BLS/RJL/CSD 11/2005

Appendix A: Checking Power and Data for Domes Using the Base without I/O Board

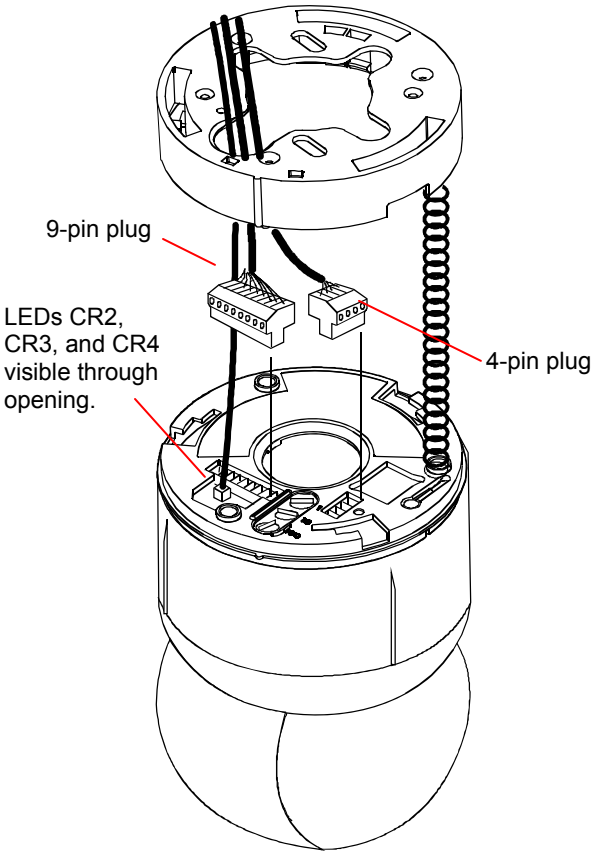
Check LEDs to verify that power and data are reaching the dome (Figure 39).

IMPORTANT! To view the LEDs, you will need to detach the dome from its base. To prevent damage to the dome, hold the dome by its housing, not its eyeball assembly.

a. If the power LED (CR33) on the I/O board glows green, then ac power is connected.

b. Green CR2, red (CR3), and yellow (CR4) LEDs surround the video connection and are visible through opening. Check that the following communication protocols are properly wired by observing these LEDs.

Figure 39. Cable connections (Manchester requires separate cables for data and power)



Manchester: After approximately 20 seconds, the three LEDs do the following:

Red	Green	Yellow	Possible Cause
Blinking	Steady, Blinking, then Steady[1]	Steady, then Off [2]	White (pin1) and black (pin 2) correctly wired. [1] When the network has been detected. [2] When data for this dome has been received. Thereafter, the yellow LED will flicker when data is sent to this dome.
Blinking	Steady, then Blinking	Steady	White (pin 1) or white and black (pin 2) wires not connected, or white and black wires shorted.

RS-422: Set the domes address switches to 900 test mode, then apply power.
After approximately 20 seconds, the three LEDs do the following:

Red	Green	Yellow	Control [3]	Possible Cause
Mostly Off, Blinking On	Mostly Off, Blinking On	Rapidly Blinking	Yes	RX+ (pin 6) and RX– (pin 7) correctly wired.
Mostly Off, Blinking On	Mostly Off, Blinking On	Rapidly Blinking	No	Wire to RX+ (pin 6) not connected.
Mostly On, Blinking Off	Mostly On, Blinking Off	Rapidly Blinking	No	Wires to RX+ (pin 6) and RX– (pin 7) reversed.
Off	On	Alternating Off and On Every 60 Sec.	No	Wire to RX– (pin 7) not connected. Wires to RX+ or RX– not connected or shorted together. Wires to RX+ and/or RX– shorted to ac ground.

[3] When not in address 900 test mode.

When done testing, reset the address switches back to the camera address.

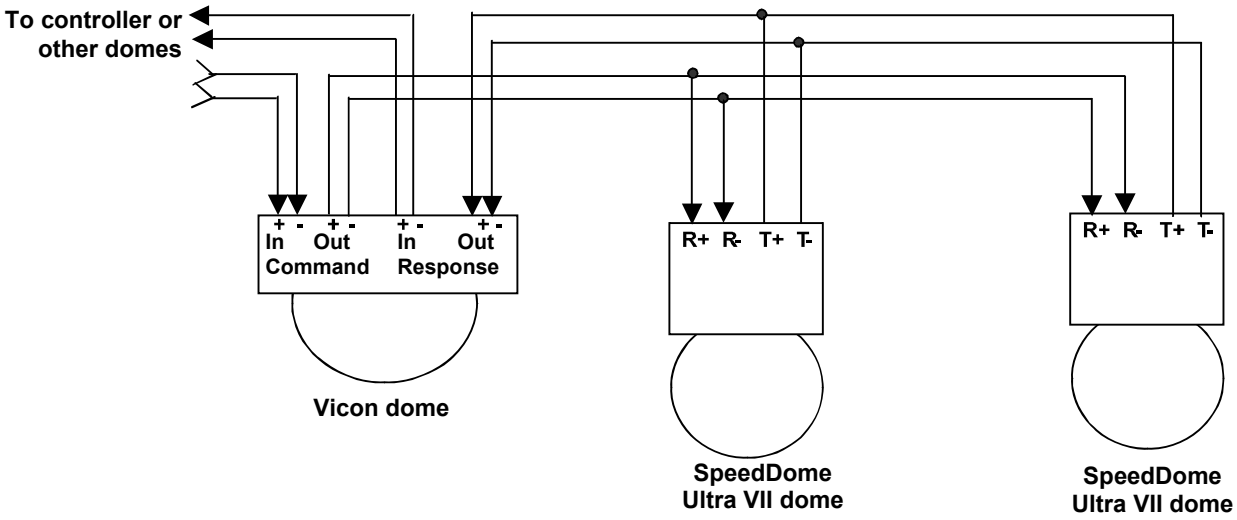
SensorNet: After approximately 20 seconds, the three LEDs do the following:

Red	Green	Yellow	Control	Possible Cause
Blinking	Steady, then Rapidly Blinking	Steady, then Off [4]	Yes	Pins 1 and 2 correctly wired. [4] When data for this dome is received. Thereafter, the yellow LED will flicker when data is sent to this dome.
Blinking	Steady, then Rapidly Blinking	Steady, then Off [5]	No	Wires to pin 1 and/or pin 2 shorted to ac ground. [5] When data for this dome is received.
Blinking	Steady, then Rapidly Blinking	Steady	No	Wire to pin 2 not connected.
Blinking	Steady, then Blinking	Steady	No	Wires to pins 1 and 2 shorted together. Wire to pin 1 not connected or both wires to pins 1 and 2 not connected.

Appendix B: Vicon Wiring Configurations

In Vicon systems where domes support loop through, daisy chain the SpeedDome Ultra VII domes off the last Vicon dome in the communications chain.

Figure 40. SpeedDome Ultra VII dome loop-through wiring from Vicon dome


To controller or other domes
+ - + - + - + -
In Out In Out
Command Response
Vicon dome
R+ R- T+ T-
SpeedDome Ultra VII dome
R+ R- T+ T-
SpeedDome Ultra VII dome

In Vicon systems where domes support RS-485 daisy chaining, daisy chain the SpeedDome Ultra VII domes off the controller or one of the Vicon domes in the communications chain.

Figure 41. SpeedDome Ultra VII dome RS-485 wiring from Vicon dome